MAR 18 1898

THE IRON TRADE REVIEW

VOLUME XXXI. CLEVELAND, O. MARCH 17, 1898. CHICAGO, ILL. NUMBER 11

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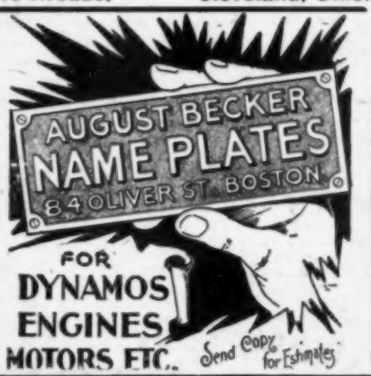

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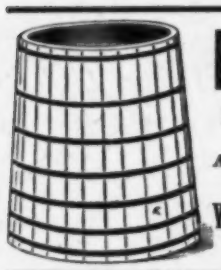

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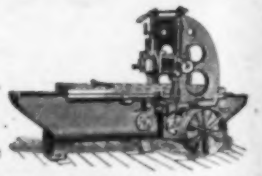

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THE IRON TRADE REVIEW

VOLUME XXXI. CLEVELAND, O. MARCH 17, 1898. CHICAGO, ILL. NUMBER 11

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

At the moment the deterring influence of war possibilities is stronger in the iron trade than the effect of the Government demand upon certain works. Apart from the agitation and uncertainty that have made some impression upon all lines of business, the recent quietness in the iron trade may be a natural interval between the large buying of December and January, and the ordinarily active months of the year, now approaching. Except on material which carries an agreed price, the tendency of the market in the past three months has been generally toward a lower level; yet the decline is scarcely appreciable, consumption and production being only fractionally apart. Pig iron stocks have increased for four months, but not greatly. The limit of production on the present level of prices has seemed about exhausted, as each monthly blast furnace statement appears; yet each month adds a little, and there are still some slight additions to be made. The expectation of a large spring demand will tend to keep in line all producers now active; and the next two months will decide whether 1898 will bring profits as well as large tonnage to the iron trade. The producers of Lake Superior Bessemer ores, to begin with, have a 15-cent advance over 1897, which with a lake freight 5 cents lower than last year's and, for many of them, a rail freight from mine to lake 5 cents less than in 1897, will give a fair profit, as compared with last year's result. In the past week some round sales to the Illinois Steel Co. have been negotiated, and valley furnacemen are figuring, though no large business with the latter has been closed. The merchant makers of Bessemer iron in the Central West are perfecting an organization, somewhat on the lines of the Bessemer Ore Association. The objects are to reduce selling cost, eliminate the manipulation of middlemen, and get a margin over the increased cost of their ore. The meeting of Tuesday in Cleveland made progress on the plan. To-day the minimum valley quotation on Bessemer iron for second quarter is $10. Sales in the week have included lots at $9.85 for second quarter delivery. Steel work in the Pittsburg district and Ohio are covered for most of the second quarter, and the Chicago interest has not appeared in the market as yet, its reported purchase from Missouri being denied. Billets are firm under conditions recently noted, the capacity of Central Western steel works being well taken for the next three months. But third quarter business in sheet and tin plate bars tells a different story, tin bars having sold in the week at about $1 below recent quotations. Southern furnaces have done little business since the establishment of uniform delivered prices. It is reported that furnaces selling below $7.25 Birmingham for No. 2 foundry are now filled up and that weak prices are not heard. In the Chicago district Northern furnaces have taken most of the recent business, and now local irons are held at the price of Southern. Lake Superior charcoal iron is higher and demand holds up, one deal involving 12,000 tons for car coupler work being made in the week by the leading selling interest. The announcement of the probable failure of the wire consolidation, based on the development of irreconcilable differences at New York, was followed quickly by the giving out at Chicago of information concerning a consolidation taking in a part of the plants originally under consideration, the list being given elsewhere. It is now stated, however, that efforts are still making at the Eastern end of the line to accomplish something on the original plan before the expiration of options, April 4, and while there is believed to be little chance of agreement, the announcement of the limited consolidation may have its influence in securing concessions. The wire and nail markets have been weaker of late, but Central Western manufacturers are generally holding to $1.15 on wire and $1.40 on nails as minimum. The situation in respect to most rolled products is unchanged. The taking of shipyard work in the East by Pittsburg mills indicates that order books are not being replenished as fact as old orders are being filled, and that soft places are likely to be in evidence for a little time.

PITTSBURG.

OFFICE OF *The Iron Trade Review*,
807 TRADESMEN'S BUILDING, March 16.

Pooling projects are still discussed. The week's gossip regarding the blast furnacemen's agreement has had some foundation in fact, and two conferences with this end in view have been held. Prices of iron, however, have not changed, though sellers are firmer. The wire rod movement, given up last week as dead, is again stirring, and there is an effort to carry it through before the expiration of options on April 4. A noteworthy sale of the week is an English ship plate order of 5,000 tons, which came to a local mill through its London sales agency.

PIG IRON.—Pending a settlement of the projected scheme of valley furnaces for a single selling agency and an allotment of output, the latter are quoting $10, valley, for second quarter shipments of Bessemer iron. Only to this nominal extent is Bessemer iron affected by the talk of a pool, and 20,000 tons sold at $9.85 valley for second quarter. Some prompt iron is also offered on a $9.75 basis. Sales of No. 2 foundry are more numerous, but prices do not rise above $10. Sales at $9.80 and $9.90 are reported. Gray forge is quoted at $9 to $9.10. Quotations follow:

Bessemer, second quarter valley	$ 9.85 to $10.00
Bessemer Pittsburg, second quarter	10.40 to 10.50
No. 1 Foundry	10.40 to 10.50
No. 2 Foundry	10.00 to 10.15
No. 3 Foundry	9.50 to 9.75
Gray Forge	9.00 to 9.10

BILLETS.—There has been little new business during the week to change the situation in billets. Wheeling district quotations are $15 and $15.25, maker's mill, and Pittsburg prices are $15.25 and $15.50, maker's mill. On an attractive specification, $15, mill, was accepted in the week.

RODS.—Rods change but little under the varying fortunes of wire pool schemes. The supply is scant, and $23, maker's mill, is asked. The combination scheme, which a week ago was given up as lost, has been revived, and negotiations are on once more, with mills not included in the newly announced Chicago program.

SHEET BARS.—In some directions sheet and tin bars show weakness, and recent low sales have been duplicated in the last ten days. Other mills are well booked and will not shade $17, maker's mill. Pittsburg quotations are $17.25 to $17.50, delivered. An order for 8,000 tons was taken during the week by a Wheeling District mill, deliveries running over several months.

STRUCTURAL MATERIAL.—So far prices on shapes are being held. A meeting of the concerns now maintaining agreed prices occurs in New York, Wednesday of this week, andsome alterations suggested by the three months' trial will be brought up. Orders exempt from pool restrictions, because booked under options antedating the agreement, have made up the

bulk of the business handled by the mills thus far, and the real test of the agreement is ahead. Shapes are quoted as follows f. o. b. mill: Beams, 3 to 15 inches, 1.15c; 18 to 24 inches, 1.25c; zees, 1.15c; tees, 1.20c. Universal plates in connection with other shapes are selling as low as 1c; alone, 1.10c.

IRON AND STEEL SKELP.—Iron and steel skelp is quoted in Pittsburg as follows: Grooved steel skelp, 90c to 95c; sheared steel skelp, 1c to 1.07½c; grooved iron skelp, 1.05c to 1.10c; sheared iron skelp, 1.12½c to 1.15c, four months f. o. b. buyer's mill, or 2 per cent off for cash.

SHEETS.—A good-sized sale of No. 27 sheets is reported at $1.95, deliveries running at buyer's option. For the gauge and size of order the sale is slightly above the market, which is on a basis of 2c for No. 28. A number of inquiries of unusual size are going the rounds, and some are ready to be closed. Galvanized sheets at 80 and 5 and 80 and 7½ per cent off list are active. Some good orders were placed in the week.

BARS.—Pittsburg quotations on steel bars are 95c, with one mill asking 1c. Less than .95c was done during the week. There is little demand locally just now for bar iron, which is quoted at .90c and .95c valley.

PIPES AND TUBES.—An order for 28 miles of 8-inch pipe for the Standard Oil Co. which was divided among three mills, is the only sale of any size reported. Some jobbers have been buying for spring trade, accepting present prices. Work ahead, as indicated by inquiries and gas and oil country projects, will be heavy. Prices do not improve. Base discounts are as follows: Butt weld, black, 57 per cent off; lap weld, black, 67 per cent off; butt weld, galvanized, 50 per cent off; lap weld, galvanized, 55 per cent off. The additional discounts are 6 tens and 5 per cent on small lots and 6 tens and 7½ per cent on attractive orders Discounts on merchant boiler tubes are as follows: 2¼ inch and smaller, 72½ per cent off; 2½ inch and larger, 75 per cent off.

TRACK MATERIAL.—On track material we quote as follows: Iron track bolts, 1.65c to 1 70c; steel spikes, 1.45c to 1.55c; splice bars, 1.10c to 1.15c; links and pins, 1.20c.

FERRO-MANGANESE.—Domestic ferro-manganese, 80 per cent, is quoted at $47.

PLATES.—Telegraphic dispatches announce a sale of 5,000 tons of plates from a Pittsburg mill to English shipyards through the London agency of the selling company. Specifications have not been received as yet in Pittsburg. Plates are quoted locally as follows: Tank, 1c; shell, 1.10c; flange, 1.20c.

OLD MATERIAL.—A lot of 500 tons of steel rails sold during the week at $10.50, and a 700-ton lot of old iron rails sold for $14, gross. Car wheels have brought $10, net, Pittsburg, and 500 tons of No. 1 wrought scrap was sold at $11.65, net. Other prices are: Old steel rails, short length, $11; coil spring, $11.25; car wheels, $10.35, gross; wrought turnings, net, $7.75; heavy melting stock, $10.50; cast borings, $6.25; heavy busheling scrap, $9.75; crop ends, billets and blooms, run of mill, $11.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
1142 MONADNOCK BLOCK, March 16.

Considerable business in various lines was done last week, quite a good deal of it in large lots. All the furnaces in this district are sold up for the next six or eight months. The local and nearby mills are also well sold ahead on nearly all kinds of material. The demand is still large, and there are indications that business will keep up on the scale of the past two months. Consumers of iron report a large sale of their products, and there is little doubt in the minds of most of the iron and steel men here that the consumption of material this year will be far ahead of any previous year. Except in pig iron, where agreement has been made effective, prices do not appear to be affected as yet by the large demand, but it is not thought the present low level will be maintained if the spring demand reaches expectations.

PIG IRON.—Considerable sales of Southern iron were made last week, nearly all of them by furnaces outside of the agreement, and at prices slightly lower than those quoted below. Northern furnaces report a quiet week. This was largely because the furnaces are so well sold up as to be independent, and are asking for what little iron they can sell for short time delivery, prices higher than buyers want to pay. The Mayville Furnace, which a week ago was making prices under those of other local furnaces, is now out of the market, being sold up into the fall. The demand for iron has not abated, several large buyers being in the market at present. Foundries generally, and the malleable foundries in particular, are manufacturing on a large scale, and are enabled by the larger demand for their proudcts to get slightly higher prices than have ruled for a long time past. With a continuation of the demand for castings of all kinds, prices are sure to be higher, and the foundrymen will be able to make money where heretofore they have done business, if not at a loss, at least at cost. A number of new foundries are projected or being built in this district, and others are making enlargements. Quotations on iron are made as follows:

Lake Sup. Charcoal	$12 00@12 50	South'n Coke No. 3	$10 10@10 35
Local Coke Fdy. No. 1	11 50@12 00	Southern No. 1 Soft	10 60@10 85
Local Coke Fdy. No. 2	11 00@11 50	Southern No. 2 Soft	10 35@10 60
Local Coke Fdy. No. 3	10 75@11 00	South'n Silveries	11 25@11 50
Local Scotch Fdy. No. 1	11 50@12 00	Jackson Co. Silveries	12 50@14 50
Local Scotch Fdy. No. 2	11 00@11 50	Ohio Strong Softeners	12 00@12 25
Local Scotch Fdy. No. 3	10 75@11 00	Alabama Car Wheel	14 00@16 00
South'n Coke No. 1	10 60@10 85	Malleable Bessemer	10 75@11 00
South'n Coke No. 2	10 35@10 60	Coke Bessemer	11 50@12 00

BARS.—The demand is still large, and sales last week aggregated a good tonnage. Several of the mills in this district are so well sold up that they are becoming more independent as to prices, and are not selling at the low values that have been ruling for the past several weeks. Included in the sales of the week were three or four large contracts. Some buyers are beginning to be a little anxious about their future supplies, and are asking for prices on iron and steel for delivery after the first of July. The market is stiffer than it was a week ago. Quotations are still made at 1c to 1.05c for common iron, 1.10c to 1.15c for guaranteed, and 1.10c to 1.15c for soft steel bars, but, as above, some mills are asking more than these prices, and in instances are getting the advance.

CAR ORDERS.—The Union Pacific order for 1,200 cars was placed last week and two other contracts for over 1,000 cars were given out. The small order business also made a good aggregate. The car works in this part of the country are all very busy, and would be busier if they were able to secure all the castings they wanted. The malleable foundries, however, are unable to fill the demand for car castings.

RAILS AND TRACK SUPPLIES.—Several quite large orders for rails were placed last week, and further inquiries are in the market. Some of these have been held up pending developments in the Cuban situation. Quotations are as follows: Rails, $20 to $22.50, according to specifications; steel splice bars, 1.20c to 1.30c; track bolts, with square nuts, 1.80c to 1.90c; hexagon nuts, 1.90c to 2c; spikes, 1.60c to 1.65c.

BILLETS AND RODS.—A number of orders for steel are hung up pending more definite announcement concerning the plans of the limited wire combination. These amount to a considerable tonnage. Little business was placed in the week. Prices are unchanged at $17 for billets and $25 for rods.

STRUCTURAL MATERIAL.—The Illinois Central order, amounting to about 4,000 tons, was taken last week by the Detroit Bridge Co. The steel will be rolled in Pittsburg. The Lake Shore elevation material will be furnished by the Carnegie Steel Co., Ltd., the work being done by the American Bridge Works. This amounts to about 3,000 tons. In addition a considerable business was done in small lots. The Post-office job will be let on April 4. It is expected that this will amount to 10,000 tons, or thereabouts. Quotations are made as follows: Beams, 15-inch and under, 1.30c to 1.35c; 18, 20 and 24-inch, 1.40c to 1.45c; angles, 1.15c to 1.25c; plates, 1.10c to 1.15c; tees, 1.35c to 1.40c. Small lots from stock are quoted at one-quarter to one-half cent higher.

PLATES.—The Illinois Steel Co. has the order for ship plates for a vessel to be built by the Chicago Shipbuilding Co., and further material in this line is to be placed in the immediate future. Considerable other business in plates was done last week, and the inquiry denotes a continuance of sales. Prices are not very strong, but are unchanged. They are as follows: Tank steel, 1.10c to 1.15c; flange steel, 1.40c to 1.45c; fire box steel, 1.85c to 5c.

MERCHANT STEEL.—Sales last week were quite large, and included several season contracts. The demand appears to be on the increase. Prices follow: Open-hearth spring, tire and machinery steel, 1.65c to 1.75c; smooth finished ma-

chinery steel, 1.60c to 1.65c; smooth finished tire, 1.45c to 1.50c; tool steel, 5.50c to 7.50c; specials, 11c and upwards.

SHEETS.—Business has been very good, both in mill orders and store business. Local dealers find signs promising for business in the next few weeks. Quotations are made at 2.05c to 2.15c for No. 27 black, and 80 and 7½ to 80 and 5 per cent discount for galvanized.

SCRAP.—Not very much was done in scrap last week. There is not a very large demand, and not much scrap is offering. The railroad lists of scrap are small. Dealers' selling prices are as follows:

Old iron rails, gross,	$12 50@$13 00	Axles, net	$14 25@14 75
Old steel rails, long, gr.	10 50@ 11 00	Cast borings, net	4 00@ 4 25
Old steel rails, short	9 25@ 9 50	Wrought turnings, net	5 50@ 6 00
Old wheels, gross	11 00@ 11 50	Axle turnings, net	7 25@ 7 50
Railroad forge, net	12 00@ 12 50	Mixed steel, gross	7 25@ 7 50
Dealer's forge, net	10 50@ 11 00	Stove plates, net	6 00@ 6 25
No. 1 mill, net	7 50@ 8 00	Heavy melting steel, gr.	8 25@ 8 50
Heavy cast, net	8 50@ 9 00	Old iron splice b., net.	13 25@ 13 50
Malleable cast, net	8 00@ 8 50		

CLEVELAND.

OFFICE OF *The Iron Trade Review*,
27 VINCENT ST., March 16.

The negotiations opened at Chicago last week between representatives of ore selling firms and the Illinois Steel Co. will end this week in the placing of orders for several round lots of old-range Bessemer ores, all the old ranges sharing in the business. As was the case last year, the Chicago company buys its Menominee and Marquette range ores at the mine or at Escanaba and arranges its own lake transportation from that point. Between 1,000,000 and 1,500,000 tons of old-range ores will be taken in all, the requirements of the company, with 1,000,000 tons of Mesabi ores, being in the neighborhood of 2,500,000 tons. A number of valley furnacemen who visited Cleveland Tuesday in connection with the meeting of Bessemer pig iron producers indicated in part their requirements for the coming season, and several deals are pending. The announcement is made by the Chicago & Northwestern Road and the Wisconsin Central, of a reduction from 45 to 40 cents in the rate on ore to Ashland. The Northwestern reduces the rate on Gogebic ore to Escanaba to 85 cents. Its other rates to Escanaba are reduced 5 cents, making the charge from Iron Mountain, Commonwealth, Florence, Negaunee and Ishpeming, 40 cents instead of 45, and from the Crystal Falls district, Iron River, Republic, etc., 43 cents. The vessel situation is not promising for carriers. While some season business has been done at 65 cents from the head of the lake, it seems quite well established that several large blocks of tonnage have been secured at 60 cents to Nov. 1, which is the season on Duluth or Ashland business. Vessels have been freely offered at 60 cents to Oct. 1. Counting the Mesabi ore which the Bessemer fleet will carry, it is probable that upward of 2,000,000 tons of Carnegie-Oliver ore is already covered.

PIG IRON.—The meetings of furnacemen in the valleys and Cleveland producing Bessemer iron for the market have resulted in substantial progress. The latest conference was held in Cleveland on Tuesday and lasted through the day. A further meeting is to be held, with a view to perfecting details. The purpose of the proposed arrangement is to eliminate the broker's commission and dealers' manipulation of the Bessemer pig iron market. No action has been taken by which any valley furnaces will be closed down, but the association will be a steadying factor, and will save the marketing of weak iron at demoralizing prices. The figure talked of for second quarter iron, $10 at valley furnace, is not unreasonable, considering the new basis for ore and the present price of coke. That a very conservative figure will be maintained, is guaranteed by the fact that the principal customers of the valley furnaces, having no furnaces of their own, must have iron at a price that will enable them to compete with the steel works having their own pig iron supply. A sale of 4,000 tons of Bessemer, delivery May to July, was made the past week at $9.85 in the valley, and earlier $9.75 was done for March and April. Foundry iron is very quiet locally, but the firmer situation in Bessemer has caused a raising of quotations by some producers. On some Scotch irons $9.75 valley for No. 2, or an advance of 25 cents over previous quotations, has been asked in the week. The situation as to Lake Superior charcoal iron is improved. Further large sales have been made and quotations are advanced 50c to $1 above the recent level. We quote, Cleveland delivery:

Bessemer, second quarter	10 65	Valley Scotch No. 1	$10 40@10 65
No. 1 Strong Foundry	10 40	Valley Scotch No. 2	10 15@10 25
No. 2 Strong Foundry	9 90	Gray Forge	9 15
No. 3 Foundry	9 40@ 9 50	Lake Superior Charcoal	11 50

BILLETS AND TIN PLATE BARS.—Rod mills are generally covered for the second quarter, and little local activity in billets is reported. There is some inquiry for ingots for forgings for Government work, and quick delivery is asked. In tin plate bars two contracts have been made by works having headquarters in Cleveland—one for 8,000 tons and the other for 5,000 tons, taken respectively by Wheeling district and valley mills. There was sharp competition and prices were in the neighborhood of $16 mill, or nearly $1 a ton below what has been current recently.

FINISHED MATERIAL.—A rail order for 1,000 tons is pending at Toledo. Bars are quiet. On iron, while some sellers have been able to maintain 1c Cleveland, there has been considerable cutting by valley mills. In competition with Pittsburg in territory carrying a lower freight from Pittsburg than valley mills, 90c has been done, and on one order $17.85, net ton, is reported. The sheet market is fairly active, specifications for steel range work being a feature. We quote 2c to 2.05c, Cleveland, for No. 27 and 2.10c for No. 28. The wire and nail trades seem to be awaiting developments. Jobbers are talking lower prices since the announcement of the failure of the consolidation, and the market is lower than some of the prices quoted two and three weeks ago, but mills are holding to $1.15 for smooth wire, while $1.40 for wire nails is minimum with most nail manufacturers. Offers at lower figures have been refused. With wire and rods nominally on a parity, it is evident that little new business will be done in the latter, and that third quarter contracts must be taken on a lower basis than to-day's.

CINCINNATI.

March 15.

The business of the week has shown continued demand for iron for malleable castings, in which both charcoal and coke brands have been in request. There has been increased activity at the car works and cast iron pipe foundries, which has given impetus to foundry grades. Car wheel irons are in somewhat better demand. Production is slightly in excess of consumption, though the margin is insignificant when the general figures of a million tons per month are considered. At Sheffield, Ala., the Colbert Co. yards are bare of iron, and shipments of each day's product are made direct from the furnace. This furnace has not been able to keep up with its orders. The Sheffield Co. has one stack in operation producing about 240 tons per day. Another stack, 75 feet high, 19 feet bosh, 12 feet hearth, has just been rebuilt, with every modern appliance and improvement. The starting of this stack is delayed on account of present lack of ore. Sheffield Co. has only a small stock of iron on hand and reports sufficient orders booked for several months' run. The makers of Lake Superior charcoal iron, having disposed of much of their surplus stock, have marked up their prices, which are still moderate and reasonably low. We quote for cash f.o.b. Cincinnati: Southern coke, No. 1 foundry, $9.75; No. 2, $9.50; No. 3, $9.25; gray forge, $8.75; mottled, $8.75; No. 1 soft, $9.75 to $10; No. 2, $9.50 to $9.75; Belfont coke, No. 1, Lake Superior, $11 to 11.50; Belfont coke, No. 2, Lake Superior, $10.50 to $10.75; Hanging Rock charcoal, No. 1, $14.50 to $15.50; Tennessee charcoal, No. 1, $12.50 to $13; Jackson Co. silvery, No. 1, $12.50 to $13; Standard Georgia car wheel, $14.25 to $15.

THE Centerville Foundry & Machine Co., Centerville, Ia., will erect a new foundry and machine shop, 220 feet long and 30 feet wide. The building will be of brick and iron. It is the expectation that it will be completed within 60 days.

WILLIAM SWINDELL & BROS., Pittsburg engineers and contractors, have closed a contract with the Carpenter Steel Co. for the erection of a complete crucible steel plant at its works at Reading, Pa.

A FURNACE is to be built, a dispatch says, and the long abandoned Piedmont, W. Va., iron ore mine opened.

THE IRON TRADE REVIEW

DEVOTED TO IRON AND STEEL MANUFACTURE, FOUNDRY AND MACHINERY TRADES.

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MARCH 17, 1898.

THE WIRE CONSOLIDATION.

There is no occasion to change the statement made last week concerning the failure of the promoters of the consolidation of wire and wire rod plants in the United States to bring their plans to a successful issue. It is still declared by those in position to know of the magnitude of the obstacles encountered, that the revival of the original scheme is an impossibility. However, as the options have more than two weeks yet to run, effort is still made to adjust the wide difference between the valuations on the Washburn & Moen Mfg. Co.'s plants as fixed by the company itself and by the expert accountants. The purchase of sundry blocks of stock of this company by certain of its officers, at figures below those at which it was expected the deal would be closed, but at the same time considerably above the figure fixed by the experts' report, proved a serious barrier to agreement on any compromise basis. The difference between $8,000,000 and $6,000,000 is believed to be irreconcilable.

The programme for the smaller consolidation, of which something has been given out at Chicago by President Gates and Judge Gary, includes the following plants:

The Consolidated Steel & Wire Co., seven plants; one at St. Louis, two at Joliet, one at Cleveland, one at Beaver Falls, Pa., one at Pittsburg, one at Allentown, Pa.

The I. L. Ellwood Co., two plants at Dekalb, Ill.

The American Wire Nail Co., one plant at Anderson, Ind.

The Salem Wire Nail Co., two plants, one at Findlay, O., and one at Salem, O.

The HP Nail Co., one plant at Cleveland.

The American Wire Co., one plant at Cleveland.

There is said to be some doubt about the Salem Wire Nail Co. and the HP Nail Co. entering this combination; but it is known that the American Wire Co.'s option is for the sale of its plant outright. It is said that the proposition for this lesser consolidation involves $24,000,000 capital, of which one-half is preferred and one-half common stock, and that the headquarters of the company will be in Chicago. The location of the plants in question and the fact that an arrangement with the Illinois Steel Co. is included, by which the product of the latter's rod mill and a considerable tonnage of its steel works will be taken, indicates that the completion of the deal on the new basis will be advantageous to the Chicago interest, affording a steady outlet for its steel.

Many of the statements circulated as to the reasons for the failure of the original plans are in error. The Pittsburg Wire Co. did not hold aloof, as some Pittsburg dispatches have stated; nor was there any failure in the arrangements for ample capital to carry through the project. A single company's method of reckoning earnings in the past five years gave results so far at variance with those shown by the statement of the expert accountants, that the bankers and owners could come to no common ground.

DEATH OF SIR HENRY BESSEMER.

The cable announces the death, on Tuesday evening, March 15, of Sir Henry Bessemer, the inventor of the Bessemer process. For two years the veteran engineer and metallurgist has been in poor health, and in the past few months references have appeared in English technical journals to his failing powers. He was born in Charlton, Hertfordshire, Eng., Jan. 19, 1813, and was thus in his 86th year. He was the son of a French refugee who settled in England in the French Revolution of 1789.

Sir Henry Bessemer's life history has been written so often in connection with the account of his contributions to metallurgy, and particularly of his invention of the Bessemer process, that the record has become quite familiar. He began, in 1854, to experiment in the manufacture of iron for an improved gun, and in this work the idea came to him that cast iron might be rendered malleable by the introduction of atmospheric air into the fluid metal. In 1855 and 1856 patents were granted Mr. Bessemer on his discovery, but it was not until 1858 that he was completely successful in the conversion of cast iron into cast steel. To this result, as is commonly recognized, Mushet, of England, and Goransson, of Sandviken, Sweden, contributed greatly. In 1856 Mushet took out a patent for his process of adding to melted cast iron, after it had been decarburized and desiliconized, a compound of iron, carbon and manganese. This compound, of which spiegeleisen is the cheapest and most convenient form, supplied what was lacking to the success of the Bessemer process. In his "Iron In All Ages," James M. Swank says: "The addition of from one to five per cent of this compound to the cast iron at once overcame the obstacle which had been fatal to the success of Mr. Bessemer's invention. Mr. Bessemer had decarburized and desiliconized melted cast iron, but he had not been able to retain or restore the small quantity of carbon that was necessary to produce steel, and in the oxygen of his powerful blast he had given to the contents of his converter an element which prevented the production of even good iron. Mr. Mushet's invention regulated the supply of carbon and eliminated the oxygen." Mr. Mushet's English patent for the use of spiegeleisen as a recarburizer was permitted to lapse because of his poverty, and Mr. Bessemer's prosperity began when the Mushet process became public property. It has been stated that first and last Bessemer's patents brought him royalties to the value of over $5,000,000, and that his profits out of the first company formed in England to work his process were large. These works were located in Sheffield. The following statement by Mr. J. S. Jeans was confirmed by Sir Henry Bessemer in a letter dated Sept. 10, 1890:

"On the expiration of the 14 years' term of partnership of the firm, the works, which had been greatly increased from time to time entirely out of revenues, were sold by private contract for exactly 24 times the amount of the whole subscribed capital, notwithstanding that the firm had divided in profits during the partnership a sum equal to 57 times the gross capital; so that by the mere commercial working of the process, apart from the patent, each of the five partners [Bessemer being one] retired, after 14 years, from the Sheffield works with 81 times the amount of his subscribed capital, or an average of nearly cent per cent every two months—a result probably unprecedented in the annals of commerce."

The British Government conferred knighthood upon Bessemer, and he has been for a number of years Sir Henry Bessemer. His last contribution to technical literature was in answer to the address of the late Joseph D. Weeks, delivered as president of the American Institute of Mining Engineers at the Pittsburg meeting in February, 1896. Mr. Weeks had supported the claims of Wm. Kelly, of Eddyville, Ky., to priority in the discovery of the pneumatic principle of the Bessemer process. Sir Henry sent a communication to an English iron journal, commenting with some asperity on Mr. Weeks's statements, and later prepared for a New York meeting of the American Society of Mechanical Engineers a paper, going at length into his experiments and illustrating the various devices he employed and the steps by which his process was brought to perfection.

It should be said that many and valuable improvements have been made in the application of the Bessemer process, both in the United States and Europe.

MR. CARNEGIE'S LETTER.

The Time Ripe for More Shipyards.

Mr. F. W. Wheeler, president of F. W. Wheeler & Co., ship and engine builders, West Bay City, Mich., writes *The Iron Trade Review:*

"Referring to the communication of Mr. Andrew Carnegie of March 3rd, in reference to ship building in the harbor at New York, and cheap material from Pittsburg, etc., I think the time is ripe for the establishing of greater facilities for ship building upon the Atlantic Coast. The fact of cheaper material would not cover all the features entering into the construction of American ships. The greatest barrier in the way at the present time to owning vessels of American registry is the cost of operating. It seems that it costs more to operate an American ship than it does an English ship. This is owing largely to a difference in the cost of living, and of the crew to operate the ship. But since we have arrived at a period where we are exporters instead of importers, it might tend to give American bottoms a preference in trade, which ought to stimulate the building and owning of American ships. We have arrived at a period when slight recognition in the way of favorable legislation might remove all obstacles and again give us the supremacy of the seas.

"There is no doubt in my mind that the low price of steel will continue in this country, and that we will in the future be enabled to export nearly as much material as we consume at home. This certainly ought to give great stimulus to the general business of the country; and it is more important that our people look to this and foster it in every way possible than to be absorbed with the great issues that seem to be agitating the two great political parties of the day—money and the tariff. The building up of the American fleet would in itself use such large amounts of material as to greatly stimulate trade in general.

"Our present situation with Spain, even though it may be settled by diplomatic negotiations, will lead our people to see the necessity of always being well prepared to protect this country against an attack from foreign powers, and I believe that in the future more attention will be paid to this and the navy enlarged, thereby giving a place for the consumption of a large amount of steel.

"I believe, however taken on the whole, as Mr. Carnegie states, that the time is ripe for the establishment of large ship building industries as near New York harbor as possible."

Experiment Alone Will Demonstrate.

Mr. G. N. McMillan, of the Detroit Dry Dock Co., says:

"Referring to Mr. Carnegie's letter on the establishment of a shipyard in the East under lake methods, it occurs to me it would be a grand thing for all concerned could it be carried out with success. There are, however, bright men and enterprising concerns located on the Atlantic, and that lake methods do not exist there may be from causes not apparent, but that nevertheless would have to be overcome. When ship material can be carried from Pittsburg to New York for $1 per ton, with reasonable dispatch, the time may be ripe for the establishment of a modern up-to-date shipyard that will mark the beginning of more satisfactory conditions in our shipbuilding and the expansion of our ocean commerce. I believe Mr. Carnegie's views will be realized, but whether the success will come in the immediate future or at a more distant day can only be answered by the experiment."

Not too Soon to Begin Now.

In answer to a request from the *Marine Review* for an opinion regarding the recent letter of Andrew Carnegie to *The Iron Trade Review*, of Cleveland, Mr. W. I. Babcock, of the Chicago Ship Building Co., says:

"Mr. Andrew Carnegie's recent letter to *The Iron Trade Review* on ship building and the establishment of a great ship yard near New York is a very interesting paper, and it is causing widespread comment. His arguments are sound and incontrovertible. His statement that the total cost of labor would not be less in this country than abroad, even with our higher wages, provided a modern yard was built with the latest labor-saving appliances, is exactly what I said recently in the *Marine Review* and I am pleased with such confirmation from so eminent an authority. That steel is now cheaper here than abroad, and will remain so, is well known. Doubtless also the vicinity of New York is the best location. Incidentally, the graceful compliment to our lake ship builders will be much appreciated around the lakes.

"The best yard in the world, however, would amount to little without ships to build and contracts do not always go to the lowest bidder, even on Government work. That foreign orders would come to this country on account of lower prices alone I do not believe; certainly not for a long time, and, with even more certainty, not to a new yard, until its reputation was established by domestic work. Such a yard, therefore, must depend principally upon the domestic demand, and there is no domestic demand at present which the existing coast yards are not amply able to fill. When the agitation now going on for such national legislation as will enable us to regain our lost carrying trade bears fruit at Washington, there will be a gradually increasing demand for American ships, and then not one, but many, such yards as Mr. Carnegie describes will be the result. As, however, the proper establishment of such a yard and the creation of an efficient and harmonious force of workmen, foreman and heads of departments, is a work of several years, it is perhaps none too soon to make a beginning."

Personal.

T. B. Walker, formerly manager of the Monongahela Furnaces of the National Tube Works Co., at McKeesport, Pa., has accepted the position of superintendent of the furnace now being built by Frank B. Baird, at Buffalo, N. Y.

Edward Haupt, recently president of the Universal Construction Co., of Chicago, has just connected himself with H. A. Streeter, Globe Iron Works, Chicago, in charge of the structural department.

War Preparations and the Iron Trade.

Aside from the work that is being given out by the Navy Department at Washington to put all the country's naval equipment in effective shape, the Cuban complications have loosened purse-strings on impending appropriations. For example, the House Committee on Naval Affairs at its meeting March 11 authorized three new battleships, and fixed $400 as the limit for armor. This means, also, that $400 armor will be bought for the three vessels now under way. The three contemplated by the new bill will cost about $5,000,000 each and $2,000,000 on each will be available in the coming year.

The Firth-Sterling Steel Co., of Demmler, Pa., the Carpenter Steel Co., of Reading, Pa., and the Midvale Steel Co., Philadelphia, have been asked to bid on large projectile contracts aggregating $2,500,000, and all these plants are now busy night and day on Goverment work already in hand.

The Bethlehem Iron Co., Bethlehem, Pa., has orders to push Government work on the 100 10-inch and 12-inch guns and carriages it has under contract, and large forces of skilled mechanics are busy night and day. Several Cleveland concerns, the Otis Steel Co., Brown Hoisting & Conveying Machine Co., and the Cleveland City Forge & Iron Co., are figuring on gun carriage and other work on which special dispatch is desired.

Furnace B of the Edgar Thomson blast furnaces, at Braddock, Pa., which has been undergoing repairs, was blown in on Saturday. Besides relining, new furnace appliances have been added. Instead of the old-style hoists, an incline like that at Duquesne has been built, on which runs a massive scoop-shaped iron car. This car holds 15 times as much as the smaller bucket cars, which carry ore from the bins. The incline car runs along the top of the furnace and automatically empties its contents into the furnace without the aid of top-fillers. The car then runs back to the incline by the same method. Two carloads make a "round" of material. Furnace B, which was producing manganese before its suspension, is now on Bessemer pig iron. All of the blast furnaces of the Braddock plant are now in operation, but one of them may be taken off in six or eight weeks for improvement.

The American Tin Plate Co.'s plant at Elwood, Ind., is again being enlarged. Six hot mills are to be built.

TYPICAL CHINESE FOUNDRIES.

Mention was made in these columns some time ago, of the trip on which Mr. Irvin McDowell, of Chicago, had gone to China, Japan, Australia and other countries, in the interest of Rogers, Brown & Co., and with a view to extending the sale of American pig iron. In our issue of Dec. 2, 1897, appeared a letter from Mr. McDowell, written at Kobi, Japan, giving some account of the effort of Japan to establish an iron industry. In his travels in China, Mr. McDowell was able to get a number of views of Chinese foundries, which tell their own story of the poverty of industrial China. While the methods of the new world are being grudgingly and hesitatingly copied in some of the iron-working establishments of the Celestial Empire, the old Chinese type of foundry is the rule, and the views reproduced herewith are entirely representative of the rude and primitive character of equipment and operations.

FIG. 1.—FIRST FOUNDRY IN CHINA TO USE AMERICAN PIG IRON.

Not only are the Chinese foundries, outside of a few of the largest—those belonging to railroads and to shipyards—ill-equipped, lacking modern cranes, cupolas and blowing apparatus, but they are ill-kept, as the illustrations give ample evidence. The cupolas, as will be seen, are portable, and are constructed in cylindrical sections. The largest of those shown have sections of about 20 inches depth. The lower section has the tap, and generally the tuyere hole and the bosh, as well. Charging doors are unknown; everything goes in at the top, except the air, which is admitted through a single opening.

In Fig. 1 is a typical Chinese foundry, untouched by modern methods or equipment. The beginning of the end of this Acadian simplicity seems at hand, however, for this foundry has used Alabama pig iron, being the first of the strictly primitive foundries to make this innovation. Seated beside Mr. McDowell in the middle-ground is Pah Kee, an iron merchant of Shanghai. The second view is the interior of the Shanghai foundry, the yard of which is shown in Fig. 3. The method of supplying blast is seen here, and the sectional cupola. Simplicity could scarcely go farther. It is to be inferred that the problems of the metalloids and of test bars, and of the relative hardness of the first and last iron from the tap-hole have not penetrated this arcanum of metallurgical mystery. In Fig. 3 the master magician of the Chinese foundry, the cupola man, is seen, surrounded with some choice specimens of melting implements. The foundry is one of the largest about Shanghai, of the Chinese style. The various sizes of cupolas will be noted, and the fact that they seem to have been constructed particularly with a view to

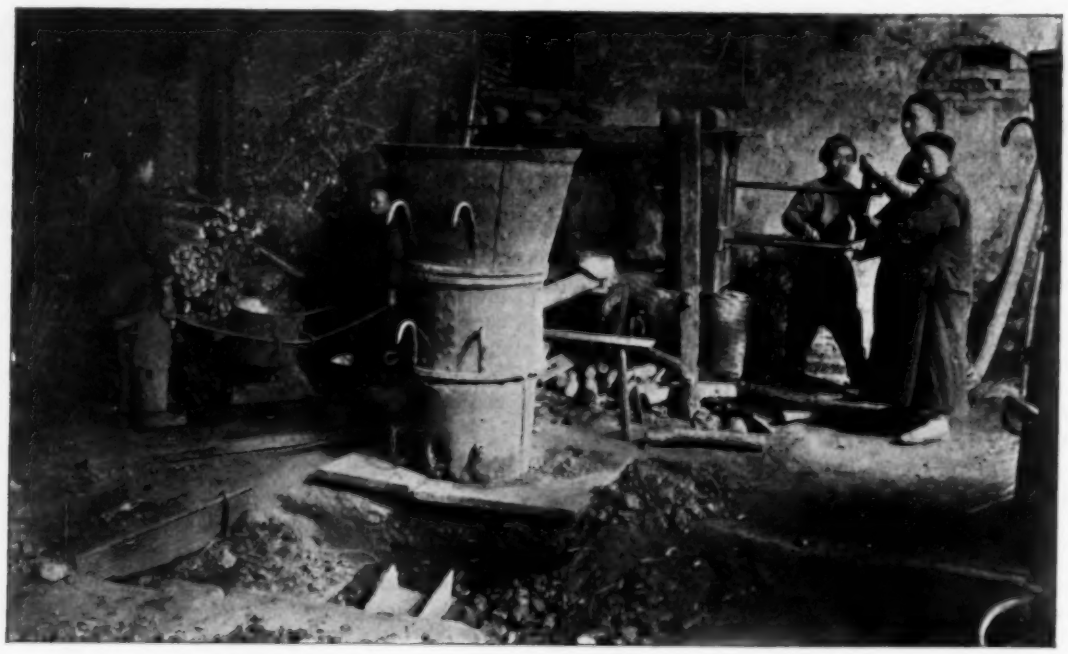


FIG. 1.—INTERIOR OF CHINESE FOUNDRY. BLOWING MACHINE, CUPOLA AND LADLE.

ready portability. The door on the left leads into the blacksmith shop. The portion which has corrugated iron for the roof is the foundry.

THE FUSIBILITY OF PIG IRON.

A German Authority Comments on the Work of American Investigators.

Dr. G. Berthold, of Berlin, the official reporter of the German Society for Industries, sends a condensation of the minutes of the February meeting, presided over by Minister of State von Dolbrueck. Captain Henning read the paper of the day on "The Fusibility of Pig Iron and Its Influence in the Foundry." He opens with a statement of the views of the late Wm. Siemens, that the methods of charging blast furnaces and cupolas show room for considerable improvement. The investigations of Mr. Thos D. West and Dr. Moldenke are cited. It is shown that chemical analysis and physical investigations have led to the possibility of obtaining uniformity in results, and that at the lowest possible cost, immense undertakings being carried through successfully on this basis. Captain Henning argues that manufacturing on a smaller scale, such as foundry work, would profit likewise by the general application of chemistry and physics. The reactions taking place in the cupola were gone into thoroughly, and the supposition that soft irons melt faster than hard ones was scouted as erroneous. The speaker based this assertion upon the views of Blecam and other authorities, as well as the measurements of melting points made by Le Chatelier, Gruner, Wedding and Lueger.

The comparisons made by Mr. West in his "twin shaft" cupola were next explained, and the inadvisability of repeated smeltings of steel in the cupola dwelt upon. On the other hand, the advantage of adding steel scrap in the reverberatory furnace was also shown.

The radical difference in the melting processes as carried on in the cupola and in the open-hearth furnace are illustrated by the experiments of Dr. Moldenke. In making chilled castings a variation from the usual phenomenon attending the casting of soft iron is noticed. While the first part of a cupola melt is hard, that of the open-hearth is the softest of the heat. At the end of both processes the iron is hard, and consequently the middle of each heat gives the best results. This is also the observation of other large American works such as at Embreville and Addyston. A cupola charged with irons graded for the melting process will always give a uniform run of castings, except at the very beginning and end. Chilled and sand castings poured from the same ladle show remarkable differences in structure, chemical composition and specific gravity. One casting will float in a bath of melted iron, the other sinks to the bottom. An elaborate series of tables was shown, explanatory of the melting processes, the conclusions derived being that specialties in cast iron, such as chilled work, are best carried on in the open-hearth furnace fired by gas, with regeneration, or else in the straight drop reverberatory furnace. Foundries using chemical analysis to guide them will fare far better than those where fracture and practical experience only are consulted. The work done at the Addyston foundry, and the problem suggested by Mr. West and Dr. Moldenke were next referred to by the speaker.

Captain Henning concludes with the recommendation that the efforts of the International Society for standardizing the methods of testing materials for construction be seconded to as full an extent as possible.

FIG. 3.—ONE OF THE LARGEST FOUNDRIES IN SHANGHAI.

SOME important foreign work may come to the Cramp shipyards at Philadelphia, according to a press dispatch. "The plans and estimates, it is said, are being drawn up for the consideration of a foreign power, and include a first-class shipyard such as operated by Cramps, besides several battleships and cruisers. Although the name of the foreign power is being kept a secret, it is generally understood by those in a position to know that the plans and estimates will eventually find their way to Russia."

A SPECIAL ore train made a test run over the Pittsburg, Bessemer & Lake Erie Road last week. The train consisted of 35 cars, weighing 18 tons each, empty, with 1,751 tons of ore, or 50 tons of ore to the car. The private car "Bessemer" was attached to the train, containing officers of the Carnegie Steel Co., the Westinghouse Air Brake Co., and officials of the railroad company.

RITER & CONLEY, of Pittsburg, have received the contract for the addition to the American Steel Co.'s plant at Sharon, Pa. The building is to be constructed entirely of iron, and will be 200 x 215 feet.

COMMERCIAL PROGRESS AND THE PIG IRON INDUSTRY*.

BY JOHN BIRKINBINE.

Comparisons of the present status of various nations, omitting temporary disturbing causes of a national or international political character, demonstrate that commercial prosperity is proportionate to the capacity of a country to produce what is required by its citizens, or for other peoples; to its financial ability to sustain these products, and to the facilities for distributing what it is able to supply. This product may be of natural growth; as of cereals, fruits, lumber, etc.; or, it may consist of minerals or of manufactured goods. And the nations which are best able to convert the natural products into useful forms, and to transport them cheaply to market, may claim pre-eminence.

A retrospect will bring to the notice of an observer numerous instances of local advancement in older districts which transformed crude into manufactured material; although the progress may have been limited to the area which could be reached by the transportation facilities applicable. As steam displaced animal or wind powers, the market available was broadened; exchanges of commodities were made possible over larger territory, and the districts benefited were increased in number and extent.

The same general conditions which influenced the advance of districts, counties, states or provinces, apply even more forcibly to nations; and we note the most marked improvement in those political divisions of the world which have developed their resources and supplied means for their distribution. In the effort to secure such distribution many natural obstacles have been surmounted, and in the common parlance "distance has been annihilated" in many instances, so that in the state of transportation to-day localities are only in part comparable by relative distances, the character of existing avenues of traffic and the competition between rival routes being more nearly the gauge for competition.

Disclaiming any desire to minimize the important bearing upon national advancement which should be credited to other specialties, the iron industry may be given a leading position in securing commercial development. The term "iron industry" is intended to include all the steps from the mining of ore to the production of the finished product in varied forms of iron and steel. The winning of nature's crude materials from the earth and (by the application of the mental and physical powers of man) the conversion of these into forms; which, when properly applied, add materially to our comforts, will improve any community and advance any nation.

In this brief summary the discussion will be confined practically to the production of pig iron, and the reliance of the more advanced stages of manufacture upon this crude metal.

Few articles which we manufacture have been so liberally discussed by political economists as pig iron, and in legislation concerning custom duties, this product has assumed such a prominent position that we may infer that this particular industry is recognized as exerting a marked influence upon the progress of a country, and especially upon certain sections thereof. Facts sustain this inference and probably no one industrial pursuit, except possibly coal mining, has done more to advance the United States than the production of pig iron, and by this product and subsequent manufactures much assistance has been given to the development of the coal mining industry, which now contributes about 171,000,000 tons annually, or 30 per cent. of the world's output of coal.

In this connection, attention may be invited to the fact that much of the earlier advancement in iron production and manufacture was based upon the use of bog ores, which abound along the Atlantic seaboard, and which bear close relationship to the ores now smelted in the Province of Quebec for the production of pig iron adapted for chilled castings, etc.

Having a general knowledge of what has been done towards the establishment of a Canadian iron industry, and the efforts to encourage this by governmental or provincial assistance, some applications of the foregoing conclusions to the future of the Dominion may be offered at this time. The suggestions are not based upon detailed knowledge of local conditions superior to that possessed by many present, for I realize how much better equipped others are to discuss this subject locally. But it may be possible for one whose professional work has included numerous investigations, of the adaptability of various locations for the establishment of iron and steel industries, and whose examinations have embraced some of the ore deposits in the dominion, to present some new phases of pig iron production as exemplified by the record of progress in the United States, which may be applied to Canadian development. If this paper should in a small way contribute to the advancement of a country whose borders coincide with those of my native land for a distance equal to one-sixth of the circumference of the globe; a country with which we have many ties; a country whose advancement must be of assistance to my own—if any words of mine can add to the future progress of Canada, I shall be more than pleased.

Canada is well supplied with ores; many of them of excellent quality, some have withstood heavy cost of transportation and paid duty for consumption in blast furnaces in the United States several hundred miles from where they were mined; others lie unattacked where nature placed them, waiting to be transformed into articles of usefulness by the hand of man.

If future investigation demonstrates that electro-metallurgy will supplant our present smelting processes, the numerous excellent water powers for which Canada is famed offer great possibilities for generating electricity cheaply and liberally, and if the utilization of the power of falling water does not extend to the primary process of reducing and smelting ores, these great reserves of power may prove serviceable in supplementary treatment of the metal produced.

Leaving this attractive field for the investigation of others, the subject of iron production may be considered in the light of present knowledge, which requires that to obtain metallic iron upon a commercial scale as to quantity and cost iron ore must be fed to blast furnaces, together with suitable fuel and flux, and these three materials must be accessible and of desirable character. The problem which seems to retard the Canadian iron industry is the bringing together of satisfactory fuels for smelting, and ore of desirable character close to the points of distribution or consumption.

In determining the availability of a district or individual location for the production or manufacture of iron or steel, the requirements of satisfactory character are:

A. The facilities of obtaining raw materials, viz.: iron ores, fuel and flux; their cost, and the character of metal which they will produce advantageously.

B. The market which can be conveniently reached, or which can be developed, and the character of product most in demand.

C. The transportation facilities, both existing and prospective, and rates obtainable on raw material and finished product.

D. The supply and cost of labor, and the conditions which may cheapen or enhance the wage rate.

E. The relation which the location bears to other established works which make similar products, and the competition which must be met from these.

F. The character of works which can be constructed, and their cost.

G. The cost to produce pig iron, and to manufacture iron and steel of the forms most in demand.

H. The probability of other locations possessing equally or, in some cases, superior advantages engaging in iron production.

I. In countries like the United States and Canada the trend of increasing population demands consideration.

The problem, therefore, is by no means a simple one, and in the light of recent concentration of numerous plants under one general management or control, the question of ample capital to build, equip and operate works, adds another factor.

In good practice the amount of ores required to produce a ton of pig iron will exceed the weight of fuel and flux necessary for smelting them, and in a general way it would appear better policy to convey the fuel and flux to the ore and smelt it. But transportation facilities, a market, and ample cheap labor are necessary to insure success. Therefore, when ores, fuel and market are not all convenient, the question as to the location of a works will be influenced by conditions affecting each special feature.

Thus in 1897, 12,500,000 tons of iron ore were shipped from

*Read before the Federated Canadian Mining Institute, Montreal, March 3 1898.

the Lake Superior mines to furnaces some of which are 1,500 miles distant, the average distance between the mines and the furnaces using the ore being, probably, 800 miles. These ores have gone partly to meet the fuel, but the predominating attraction has been the market afforded for the distribution of the metal produced and the articles manufactured from it.

Chicago, Ill., is dependent upon Michigan, Wisconsin, and Minnesota for iron ore, and Pennsylvania and West Virginia for coke; the facilities for assembling these raw materials and distributing the finished products, added to a good home market, being responsible for the present advanced position of the Chicago district.

Allegheny County, Pennsylvania, of which Pittsburg is the business center, has the distinction of producing a larger amount of pig iron than any other district in the country. It has an excellent fuel supply close at hand, but the iron ores are brought an average distance of 900 miles, from the Lake Superior region. The railroad facilities for assembling raw materials and taking away finished products, a nearby market, and intimate connection with the steel industry have combined to give Allegheny County preëminence.

The Birmingham district of Alabama is convenient to supplies of raw material, but distant from market demands, consequently its progress has been largely due to the possibility of producing non-Bessemer pig iron cheaply.

With the exception of a few charcoal blast furnaces in the New England States, the iron producing industry there is dormant, and although eastern New York and New Jersey have abundant ores, the distance from a fuel supply restricts their output of metal.

Eastern Pennsylvania fares somewhat better because of a local development of the steel industry, but is not advancing its production, nor is this to be expected unless the export trade demands greater activity on the part of its industries.

The bulk of later advances has been in the districts tributary to the great lakes, which can be conveniently reached by the excellent ores of Lake Superior.

A brief summary of the development of the pig iron and steel industry of the United States may be given in a statement of the rapidly increasing output of pig iron, this being the basis of the entire industry.

The statement is given by decades, and for the years when the product exceeded even millions of tons:

GROWTH OF THE PIG IRON INDUSTRY OF THE UNITED STATES.

Years.	Gross tons of Pig Iron made.	Remarks concerning output.
1810	53,905	
1830	165,000	Trebled in 20 years.
1840	286 903	Nearly doubled in 10 years.
1850	563,755	Doubled in 10 years.
1860	821,215	Increased nearly 50 per cent in 10 years.
1864	1,014,282	First year when an output of 1,000,000 tons is recorded.
1870	1,665,179	Doubled in 10 years.
1872	2,548,713	First year when an output of 2,000,000 tons is recorded.
1880	3,835,191	Increased two and one-third times in ten years; also first record of 3,000,000 tons
1881	4,144,254	First record of production of 4,000,000 tons.
1886	5,683,329	First record of production of 5,000,000 tons.
1887	6,417,148	First record of 6,000,000 tons.
1889	7,603,642	First record of 7,000,000 tons.
1890	9,203,703	Increased two and one-third times in 10 years and first record of production of 9,000,000 tons.
1897	9,652,680	Maximum annual product.

During the first quarter of the present year (1898) pig iron is being produced in the United States blast furnaces at the rate of 1,000,000 tons per month. Taking the record for a half century, the above data indicate that the pig iron output of 1890 was 33 times that of 1840. This is a record of progress which has never been duplicated in any similar interval of time, and it may never be again, for if the output of pig iron increased 33 times that of 1890 in 50 years following, it would exceed 300,000,000 gross tons per annum in 1940, and doubled in one year the aggregate production of pig iron for the past 50 years. Until 1840, all of this iron was made with charcoal. The year 1855 was the first recorded in which the production of pig iron by the use of anthracite coal exceeded that made with charcoal.

In 1897, the quantities of pig iron made by the different fuels was:

	Gross Tons.
Using coke and bituminous coal	8,464,692
Using anthracite or anthracite and coke mixed	932,777
Using charcoal	255,211

The great advance in the use of coke may be further stimulated by experiments which indicate that bituminous coals, not ordinarily classed as "coking," can be made into satisfactory metallurgical fuel, by carefully investigating them and treating these coals in improved ovens.

Mere figures of production do not show the real progress, for the use of the metal is a better gauge, and this is indicated by dividing the tonnage produced into the population of the United States in census years. This gives the following result:

In 1860 the U. S. produced 1 ton of pig iron for 32 inhabitants.
" 1870 " " 21 "
" 1880 " " 15 "
" 1890 " " 7⅓ "

With the rapid increase in production there has been a marked decrease in the number of plants to supply the metal.

Twenty years ago (viz., 1897) the number of blast furnaces in the United States considered as on the active list was 716. In 1897 a similar list embraced 423 stacks, of which about 200 contributed to produce the pig iron credited to that year.

While large furnaces have displaced small ones, the increase in size will not alone account for the result. Improved equipment and technical knowledge applied to iron smelting have done more than anything else to secure the advancement indicated.

The most important factor in the development of the pig iron industry is the conversion of iron into steel. This is indicated by the figures which show that in the past 10 years the quantity of pig iron rated as Bessemer has increased from 2,637,859 tons, or 40.65 per cent of the total pig iron make of 1888 to 5,795,584 tons, or 60 per cent of the pig iron output of 1897.

It is not alone the blast furnace which is desirable, for the associate industries will do much to determine the success or failure of a producing locality. The metal must be manufactured and a market for it found, convenient means for reaching that market being essential for success. The number of failures in the iron and steel industry would be fewer had these necessary features received full consideration.

THE Bullock Electric Mfg. Co., Cincinnati, has almost completed a contract at the Brooklyn Navy Yard, secured some months ago, consisting of motors for the equipment of the machine shops, to be belted directly to the shafts of, or coupled to various machine tools.

THE Franklin Steel Casting Co., Franklin, Pa., is reported to have a contract for 1,000,000 lbs. of steel castings for the Central London Underground Railway, of London, Eng.

THE Birmingham (Ala.) Foundry & Machine Co. is refusing orders for Corliss engines, having all it can build in the next six months. Other departments ,also, are quite full of work.

THE Schenectady Locomotive Works have just received an order for 12 locomotives for the Kiushiu Railroad, of Japan, being a duplicate of an order completed for the same railroad last fall. The locomotives shipped from the works in December for the Government of Japan are now being put into service at Yokohama.

IT is reported that the Johnson Co.'s Johnstown, Pa., plant, will soon begin active work on the construction of a street railway in Brazil, and that the company has also secured a good sized contract in Jamaica. It has had an engineer in Brazil for some time.

F. G. FERNSTRUM'S boiler works at Menominee, Mich., have a large amount of work on hand, among which are two large paper digesters made of ¾-inch plate. A complete air plant and large annealing furnace have recently been added to this plant.

PAWLING & HARNISCHFEGER, Milwaukee, have finished an electric crane for the Midvale Steel Co., Philadelphia, being one of five for this company. The crane just finished is a 40-ton, double trolley, five-motor traveling crane, to be used in the oil tempering plant.

A VIRGINIA FURNACE IN WAR TIMES.

A correspondent of the Ironton, O., *Register*, writing from Virginia gives this interesting interview with Absalom McGee, a veteran Virginian, who had a very accurate recollection of the operation of charcoal furnaces in the wilds of Spottsylvania county:

"There are two veins of good ore in the neighborhood, and then a little way off there is an excellent vein of block ore, not so rich; but combining the three we could always make a tolerably good foundry iron. Nearly all the shell and solid shot used in the Mexican war were made at the old furnace not four miles from this place. I remember seeing 20 wagons, with mules and oxen in large numbers, hauling the ammunition made there to Fredericksburg, where it was carried to the Government arsenal and fitted for use in the army and navy.

"Government officials were sent here to inspect and weigh the castings, and possibly the largest contract ever made by the United States Government for cannon balls before President Pierce's time was filled in our neighborhood. The fuel we used was charcoal made of oak, ash and mostly of yellow pine; plenty of every kind then grew in abundance along Mine Run, and all the way out to the Rapidan.

"It was the furnace that used up our virgin forests, and this scrub that you see is only second growth, mostly of pine. The labor we had was the slaves owned by neighboring planters, and they became very skillful in making charcoal and also in their ore digging, so that at first nothing but the best and cleanest ore was accepted.

"The furnace was blown by water power when first started, but shortly after that was run by an engine with open top cylinder, and a new outfit of machinery was sent here by the contractor, shortly before the Mexican war began. Iron was at a very fair price then, and every pound of it we made could be sold, but the Western and Northern furnaces soon took away our trade and for several years before the Civil War we would only make an occasional blast, and we forged most of our product so that our State demand for horse shoes and tire iron was supplied in Spottsylvania.

"When the war came up, I was a Whig, and was desperately opposed to secession, as all our part of the country was in the beginning, and we voted first, last and all the time to remain in the Union. As long as we remained in the convention our side carried every motion, but we got tired and left the place and shortly afterwards we were told that Virginia had seceded, and great trouble came upon us all.

"Several of my neighbors with myself were arrested and taken to Castle Thunder, and there I lay for several months with hundreds of other Virginians who would not consent to secede and rebel. My wife and five small children were left at home, but could not run the place, and most that we had had been taken for army use, so that when I was sent for to Government headquarters one day they made a proposition that I should be free if I would go back home and manage the furnace which was to be run by the Confederate Government. I refused at first, but when I got a letter from home that my family was sick and helpless I sent them word I would manage for them, and so I was set free at once and spent my time during the four years of war in these woods making iron for the Confederacy.

"Our product was only about six tons every 24 hours, nearly all of which was cast into shells and round shot. It was very white, brittle iron and could not be worked into machinery very well, but they claimed it made better shells, as it bursted with less pressure and into smaller fragments.

"The furnace was destroyed three times during the war and finally was not rebuilt, so there is not much left except cinder and a few old rotten shanties to tell where the Confederacy made her shells. Five battles, two at Fredericksburg, one at Spottsylvania, C. H., one at the Wilderness tavern, and Chancellorsville were all fought within a radius of ten miles of the furnace, and several cavalry raids were sent out to destroy it and the famous 'bloody angle' together with the battle of Mine Run was fought right on the furnace ground."

EMPLOYES of the Buhl Steel Works, at Sharon, Pa., who have been on a strike for some time have returned to work.

THE EMERY WHEEL AND GRINDING.

One of the radical changes that has taken place in shop methods during the past few years is that which has been brought about by the emery wheel. It is comparatively a few years ago that the grindstone was in universal use in machine shops. Then came a long discussion concerning the relative merits of the emery wheel and grindstone for tool grinding. The emery wheel won, and now many pattern makers, even, prefer it to the grindstone for their fine-edged tools. Meanwhile another debate was going on as to the wearing qualities of journals and bearings finished by grinding. Again the emery wheel came out ahead, and while there still may be some hesitancy about grinding the more delicate, high-speed wearing parts, it is generally admitted that a ground and lapped bearing (lapping being but a form of grinding), is the best that it is possible to make.

For accuracy, grinding has easily taken the lead. The greatest precision that is attained in machine construction is by grinding, handwork excepted; and this precision can be attained, too, much easier than by any other method, and with less skill. For speed, also, grinding processes are being used in many instances to better advantage than other ways of removing stock. A striking illustration of this is given by Prof. Benjamin, where a machine is described which is used for grinding the faces of pulleys. Finishing by buffing, polishing and grinding is taking the place of expensive bench work and mechanics in charge of shops now prefer to "rough out" the pins, spindles and other cylindrical parts in a lathe and finish by grinding, not only because they get a better job by so doing, but because they get it done quicker and cheaper.

The reasons for such satisfactory results through grinding with emery or similar material, are almost self-evident. Each little particle of emery is a tiny tool, very free cutting and so hard as to be almost indestructible. Hundreds, and perhaps thousands of these come in contact with the work at every revolution of the wheel, and it remains but to have the wheel true and to move the work in right relation to it to produce a smooth and uniform surface. The advantage of a ground surface is its close-grained quality and the slight depth of the scratches or tool marks, as they really are.

This can be best appreciated by observing the result in forcing two pieces together. A 2-inch steel pin, for example, will drive hard in a smooth, reamed hole in cast iron, if it is finished by grinding and is .0005 of an inch larger than the hole. Moreover, if it is driven out and forced in the hole again it will require practically the same pressure as before, showing the superior quality of the surfaces for wear, finish or any other purpose. On the other hand, a pin of the same size filed up in the lathe will require from .002 to .003 of an inch for forcing to give like results, and when driven in the second time will go much easier than it did at first. Such a pin is neither round nor has it a good surface.

Grinding, for finish, accuracy, speed or wear will surpass, within its proper limits, any of the other operations of the machine shop. It is the only means of finishing hardened surfaces which are considered essential in the better class of machinery.—[Machinery.

THE *Railroad Gazette* reports car and locomotive building as follows: The T. & O. C. Road will buy six freight locomotives and the Hutchinson & Southern two. The Rogers Locomotive works are building four for the Toledo, Peoria & Western. The Baldwin Locomotive Works have five on hand for the Ft. Wayne & Rio Grande, one for the Kansas City, Pacific & Gulf, and one for the Dominion Atlantic. Brooks Locomotive works are building eight for the Washington County Road. The Chicago, Indianapolis & Louisville specifies for five freight engines. The C. & N. W. has placed an order with the Schenectady Locomotive works for 10 switching and 10 freight locomotives. The Lehigh Valley is buying 1,000 cars; the Louisville & Nashville 500 coal and 100 furniture cars, and the T. & O. C. 800 coal cars. The K. C. P. & Gulf has placed 200 flat cars with Pullman's Palace Car Co. The Mather Stock Car Co., has placed 300 cars with the Missouri Car & Foundry Co., and 200 with St. Charles Car Co. The Chicago & Southeastern has ordered 200 coal cars from the Ohio Fall's Car Co. The Reading Road has furnished 400 coal cars and will build more soon. The Haskell & Barker Car Co. is building 300 cars for the Chicago, Indianapolis & Louisville.

WM. METCALF ON ACID AND BASIC STEEL.

Wm. Metcalf, of Pittsburg, the well-known steel expert, whose "Manual for Steel Users" is an authoritative handbook, writes as follows to the *Railroad Gazette*, the communication being prompted by the recent specification of acid open-hearth steel for East River bridge towers:

"You ask some questions as to the relative merits of acid and basic open-hearth steel. Perhaps it would be better to explain briefly the processes, give a few illustrations and allow engineers to draw their own conclusions.

"All open-hearth steel is made in furnaces of the same general type, gas regenerative, and usually Siemens. When the acid process is used, the bottom of the furnace, the bed in which the steel is melted is made of highly refractory siliceous sand. The charge to be melted is placed in this bed and the furnace is brought up to a melting heat.

"The base of each charge is pig iron, too high in silicon and carbon, and these elements must be reduced until the desired composition is reached. There are two general ways of doing this. One is known as the pig and ore process; the other as the pig and scrap process. In the pig and ore process a quantity of iron ore is charged with the pig, sufficient, by the reduction of the ore, to abstract the surplus carbon and silicon. In the pig and scrap process, scrap is charged instead of ore, but inasmuch as the steel must almost always contain less carbon and silicon than the mean of that in the pig and scrap the surplus must be removed by oxidation, either by the addition of iron ore, or by stewing in the furnace until the oxygen of the flame does the work. It is safe to assume that some ore is usually applied because it quickens the operation. In this acid process all of the sulphur and all of the phosphorus that are in the pig, the scrap, and the ore remain in the steel. If the ore is not all reduced perfectly, and sometimes it is not, it is liable to be mixed with the steel—a deadly enemy to its good qualities.

"In the basic process the furnace bottom is made of magnesite and dolomite. Either or both may be used; and probably the best practice is to make the bottom of magnesite and keep it in repair with dolomite. The charges and methods are the same as in the acid process, except that a quantity of limestone is used, sufficient to take up the silicon and form a basic slag. In this process almost all of the phosphorus in the charge, and a considerable percentage of the sulphur, are retained in the slag and so are eliminated from the steel. In this process, as in the acid, if the ore and limestone are not thoroughly fused and carried into the slag, some portion may get into the steel to its injury.

"The bugbear of the basic in some minds is the limestone used. This would be funny if it were not pitiable; limestone is the natural flux of iron and is used in all blast furnaces. In the open-hearth it carries off the phosphorus and a portion of the sulphur; the acid process retains all of both phosphorus and sulphur.

"Either process worked badly will give bad results, and either process worked properly will give good results. Given an acid steel and a basic steel of identical composition, equally well worked, there is no reason manifest why one should excel the other. Given charges of identical composition in an acid and a basic hearth, the basic steel will be incomparably purer chemically than the acid steel, giving a manifest reason why the basic should be better, and at no increase of cost over the acid.

"As to specifications; some engineers hold that if the steel fulfills given physical tests they care nothing for method or composition. Other engineers go so far as to attempt to dictate charges, methods, chemical composition and physical tests. The first may get very rotten material manipulated by skillful hands to meet his tests, only to fail when subjected to some unexpected stress. The second attempts to dictate beyond his knowledge and to require that which he cannot enforce; he may also cut off competition so as to leave himself as to cost at the mercy of one or two makers, with the probability that they will know enough to use their opportunity.

"Reasonable specifications such as are used by the most experienced and the most intelligent men, to be found largely among the leading railroad engineers, give the physical requirements and place a moderate maximum of phosphorus, sulphur, silicon, manganese, etc., allowable, and leave charges and methods to the manufacturers, who are the best fitted to judge of them.

"Let me illustrate the two views. Some 15 years ago a large railroad made a rigid physical specification for its springs; the springs were furnished by various makers and all endured the most careful and rigid tests, meeting fully the requirements of the specifications. The springs continued to break; hundreds of freight cars, many passenger cars, and quite a number of locomotives were constantly in the shops for repairs; hundreds of thousands of dollars of capital were thrown idle and the carrying capacity of the road was reduced. Hundreds of tons of broken springs were in the scrap heap, so many indeed that the railroad men found that to require replacement according to contract would ruin many of the spring makers.

"After careful investigation a fair and reasonable limit was put upon silicon, phosphorus, sulphur, carbon, etc., in the spring steel, and nothing said about methods. This specification was complied with at no increase in the price of springs, and a few days ago the maker of that specification told me that in the last ten years they had hardly known what it was to have a broken spring.

"I could multiply this with the cases of boiler steel; wrist-pin steel, axles, etc., but there would be no use in lumbering your columns. There has been no such trouble with bridges, roof trusses, etc., because there the maximum strains are known and provided for, and with large factors of safety; and besides, bridges are protected by guard rails, derailing switches, and every known device to keep off accidental strains. Yet bridges do fail sometimes. But if not, if a better bridge can be had for the same money why not have it And if an equally good bridge can be made by any process, why meddle with that in which you are not an expert?

"Finally, Mr. Editor, the sum and substance of my answer to you must be that common sense is the best guide."

Civil Engineers' Club of Cleveland.

At the annual meeting of the club held Tuesday evening, March 8, the annual report of the executive board was presented, showing a gain of 29 in membership for the year and a loss of 20—a net gain of 9 members. There are at present 149 active 22 associate, 14 corresponding and 5 honorary members, a total of 190. The resident members number 165, and the non-resident 25. Fifteen meetings have been held during the year with a total attendance of 524 members and 86 visitors.

The report of the secretary showed that the receipts charged to the general fund amount to $1,598.44, and the disbursements, $1,803.92. The receipts charged to the library fund amount to $120, and disbursements, $114.26. The permanent fund has a balance of $722.90.

The following officers were unanimously elected: President, Frank C. Osborn; vice-president, Samuel T. Wellman; secretary, William H. Searles; treasurer, Walter Miller; librarian, William E. Reed; directors to serve one year, Joseph R. Oldham, and Samuel T. Dodd; directors to serve two years, Ralph A. Harman and Charles W. Hopkinson.

President Ritchie made an informal address upon the state of the club, referring to those members who have died during the past year. He called attention also to the Lorain & Cleveland Electric Railway, recenlty completed, which he described as being well built and equipped and which is operated at a high rate of speed, making a distance of 19 miles in 28 minutes, including stops. The remainder of his address was devoted to a description of the new shipyard at Lorain, O., built for the Cleveland Ship Building Co. He exhibited tracings of the plan of the yard and dry dock, and of the principal buldings, and described these severally in detail, giving many interesting items. At the close of the address, Mr. Oldham remarked that this shipyard is doubtless the most efficient in the world. Many old ship yards have grown by additions, while this is one complete design.

The president stated that it is the intention of the company to extend an invitation to the club to visit this shipyard on the occasion of the launch of the first vessel completed there, which would probably take place in the month of April.

STRUTHERS Furnace at Struthers, O., made an output of 1,801 tons in a recent week, which is good work for a 16-foot stack.

MARTIN FOX ON GLASGOW FURNACES.

Writing in the *Iron Molders' Journal* of his trip abroad last year, Martin Fox, president of the molders' union, refers as follows to two foundries which he visited in Glasgow:

"After some inquiry, we located the foundry of J. King & Sons, manufacturers of sullage pipe, ranges, bath tubs, etc. This foundry employs about 125 molders, but as a specialty shop did not impress me very favorably. There did not seem to be the same order and neatness in the appearance of the floors; its equipments, either in the matter of flasks or other facilities, to expedite the molder's work, were not on a par with those found in a similar American foundry. I did not have a good opportunity to examine closely the castings themselves, but I could see that their stove-plate and range castings were much heavier than ours, and altogether lacking in that ornamentation which makes American goods so attractive to the consumer. It is only fair to say, however, that stove manufacturing is a much younger industry here than in our own country, and from what I learned, the stove manufacturer has to accommodate his wares to the peculiar prejudices of the British mind, which are hard to uproot.

"We next visited the Marine Foundry. It was evidently an old establishment and had not kept pace with its more progressive neighbors in the matter of facilities, but they did a first-class line of heavy marine engine work, and it was truly wonderful to think how they could handle the immense castings with their limited facilities. I found them rushed with work. They had molders in every nook and corner in the shop, and out of the shop too, for I found molders working on a bed about 14 feet square in the open air. In case of bad weather they used a sheet iron roof as a covering. I noticed a double-compound cylinder weighing about 20 tons, that had just been removed from the pit, and out of curiosity asked how long it had taken to make it, and was informed that five molders and two helpers had worked on it a month. As an example of the poor facilities I was told of one instance where they had to carry the iron for a twenty-ton casting a distance of 100 feet in 200-pound ladles.

"I cite these particulars not to disparage the foundries of Glasgow, but to show what is done in some of the older shops without the aid of modern shop facilities. In Glasgow they do some of the finest machinery work in the world, and no doubt have molding shops which, in point of equipment, compare favorably with any, but on this occasion it was not my good fortune to get around to them. We were handicapped in not having a guide with us, and thus lost a great deal of time finding our way, and did not know where to go to see the foundry industry to the best advantage."

JOHNSTON SAFETY WATER TUBE BOILER.

The Johnston boiler is constructed on different principles from those underlying other designs now in use in the United States. It consists of a flat rectangular water leg or tube header, connected at the top to one or more steam separating drums. This header is placed at the front end of the boiler as shown in the accompanying illustrations, and the back side is inclined at such an angle as to allow the inclined tubes to leave it perpendicular to the surface. Into this inclined side of the water leg are expanded in the usual manner the heating tubes. These tubes are each closed at the lower end by means of a cap which is fitted with a hand hole and plate; the lower end of these tubes being each independent of the other being supported in a frame which simply holds them in position. This construction, by allowing each tube to be free at one end, entirely obviates the disastrous results caused by unequal expansion and contraction of straight tubes rigidly fastened at both ends. This fact, in connection with the fact that the tubes are kept free from scale, are the special features of durability in the Johnston boiler. The water leg is divided, as shown, into two chambers by a diaphragm with a curved top. The inner circulating tubes pass through this diaphragm and communicate with the front chamber.

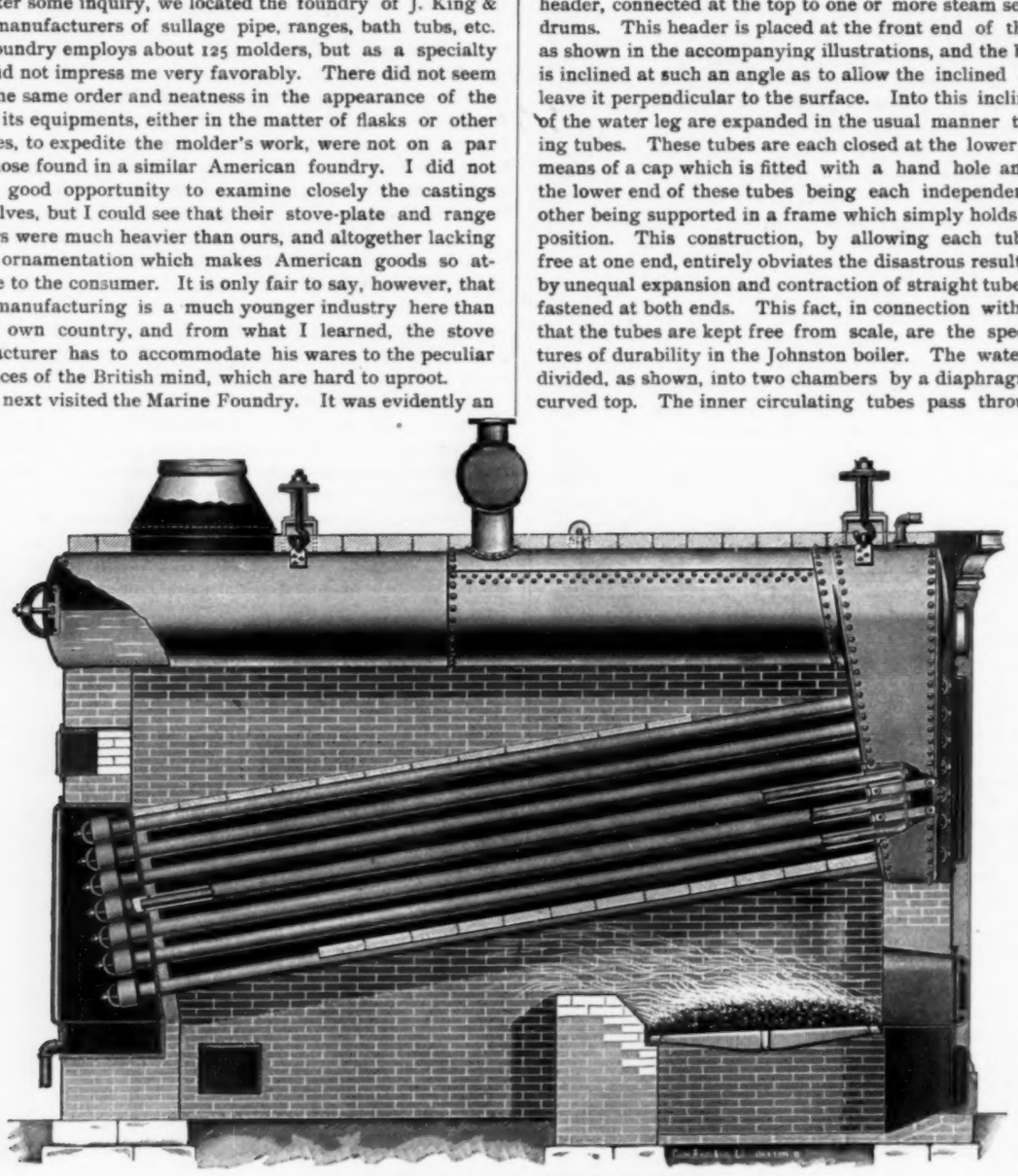


FIG. 1.—THE JOHNSTON BOILER—SIDE VIEW.

The circulation of water in the boiler is as follows: The water entering through the feed pipe being heavier than the water in the boiler, immediately sinks and is drawn through the inner circulating tubes to the rear end, where it is discharged and returns in the annular space between the tubes, re-entering the water leg on the back side of the diaphragm and thence passing upward and back into the water separating drum as indicated by the arrows on the accompanying cut. The ascending and descending currents of water are thus kept entirely separate, the result being a free, unrestricted and continuous circulation, a feature essential to the obtaining of the best results in any boiler. The passage of flames through this boiler is also different from that in most water tube boilers. As shown in the cut, the lower row of tiling is placed on the last row of tubes, the flames being thus compelled to pass the entire length of the tubes before entering into the bank of heating tubes. The advantage of this construction is that the volatile products from the coal have some time for becoming thoroughly mixed with the oxygen from the air, thus being burned before going into the tubes and becoming cooled off, their result being very nearly perfect

combustion. After getting the maximum value out of the coal, the only question then is to present sufficient heating surface to the heat generated to absorb all that is allowable.

It will be noticed that the flames are allowed to enter the bank of tubes and thus have a large area for returning, which enables the gases to pass slowly through this bank of tubes, and giving sufficient time to absorb all the heat that can be taken up, only leaving sufficient to produce draft.

In a test of a boiler of this description when being fired 40 per cent beyond the builder's rating, the efficiency of the heating surface was shown in the fact that at no time did the temperature of the flue bases exceed 460 degrees. Another important feature in regard to the water tube boiler is its ability to operate with impure water or water containing large quantities of scale bearing salts. The Johnston boiler, it is claimed, can be run in bad water and yet require very little attention, and for these reasons. As before stated, the water on entering the boiler first passes through the entire length of the inner circulating tubes, being surrounded the entire length by the hot water and steam which is returning in the annular space. Though the water be fed to the boiler quite cold, before it has passed through this inner tube it has become sufficiently heated to deposit all the scale bearing salts

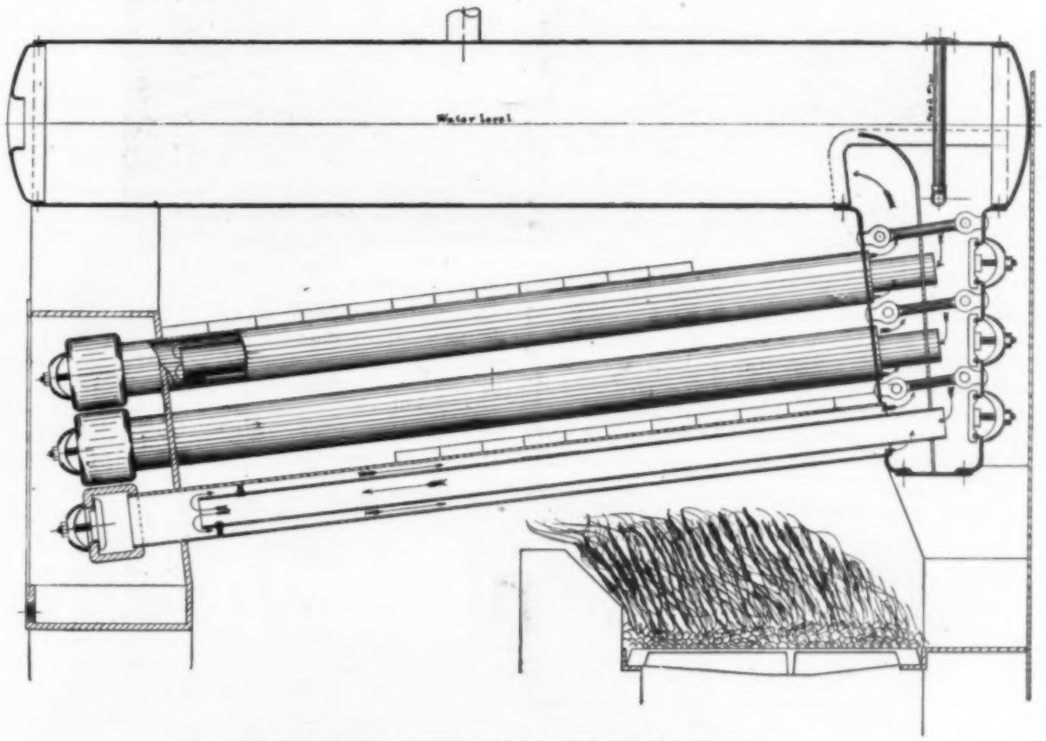


FIG. 2.—THE JOHNSTON BOILER—LONGITUDINAL SECTION.

in this tube, away from the heating surface, consequently what would under ordinary conditions soon bake to a scale, is in this boiler left in this inner tube in the form of a semi-fluid sludge. By taking out the hand hole plate at the lower end of the tube and inserting a hose in the front end, the tubes can be washed out, requiring no scraping, no getting inside of the boiler.

Another important point in connection with this action of the boiler is the effect upon the economy. Since the boiler will remain clean during a protracted term. Further, while tubes when scaled are very readily burned, it is almost impossible to burn a clean tube, providing the circulation of water is unrestricted. A number of the Johnston boilers are in operation or being installed and all in use are giving good results.

JOHN NEEDHAM & SONS, of Manchester, Eng., who recently made arrangements, on the visit of Mr. John Needham to the United States, to represent a number of American manufacturers in England, now announce that they will open offices in London for the sale of American products. They will sell iron and steel products in various lines, pig iron, hardware, machine tools and labor saving appliances in general.

THE TIN PLATE MARKET.

The market has been very quiet for the past week, and the slight improvement which seemed probable a few weeks ago has not materialized, because the buying has not been as active as was then expected. The demand for prompt deliveries is only fairly well maintained, and while prices for deliveries over next three months are better than they were a month ago, still they do not respond to the conditions that the mills claim, viz.: that there is to be a shortage in tin plates during the summer. This statement is not supported by the quotations freely offered which show 5 to 10 cents a box lower prices for deliveries beyond July than for May and June. The weakest feature about the market is the fact that there are plenty of sellers for third and fourth quarter of the year at prices showing decided concessions from those asked for earlier deliveries. There is no quotable change in the market, which stands as follows:

CHARCOAL TINS.

	IC	IX
Lisvane Grade,	$3.45	$4.20
Calland Grade,	3.65	4.35

COKE TINS.

IC, 108 lb.	Basis weight,	$2.95
100 lb.	" "	2.80
95 lb.	" "	2.70
90 lb.	" "	2.75
85 lb.	" "	2.60
80 lb.	" "	2.60

TERNE PLATES.

IC, 216 lb.,	20 x 29	$5.85
200 lb.	"	5.55

The trust negotiations are still pending, it is reported, but nothing definite is given out, and if anything is being accomplished it is being done so quietly that the trade generally knows little about it.

The above quoted figures can be generally shaded on firm bids, and the market is rapidly drifting back to the conditions existing last year, which were decidedly in buyers' favor.

THE American Pig Iron Storage Warrant Co. reports 3,800 tons put in yard in the first 10 days of March, and 4,300 tons withdawn, leaving net stock in yard March 10, 283,100 tons.

AN order has just been placed with the New York office of a wrought pipe company for 5,000 tons of iron pipe for South Africa. Business from this market has been comparatively active recently.

MECHANICAL DRAFT.

In his work on "Mechanical Draft," from which we have quoted in previous issues, Mr. Walter B. Snow gives a number of illustrations of boiler plants in which the Sturtevant fan is employed to furnish the air supply. In Fig. 1 is shown

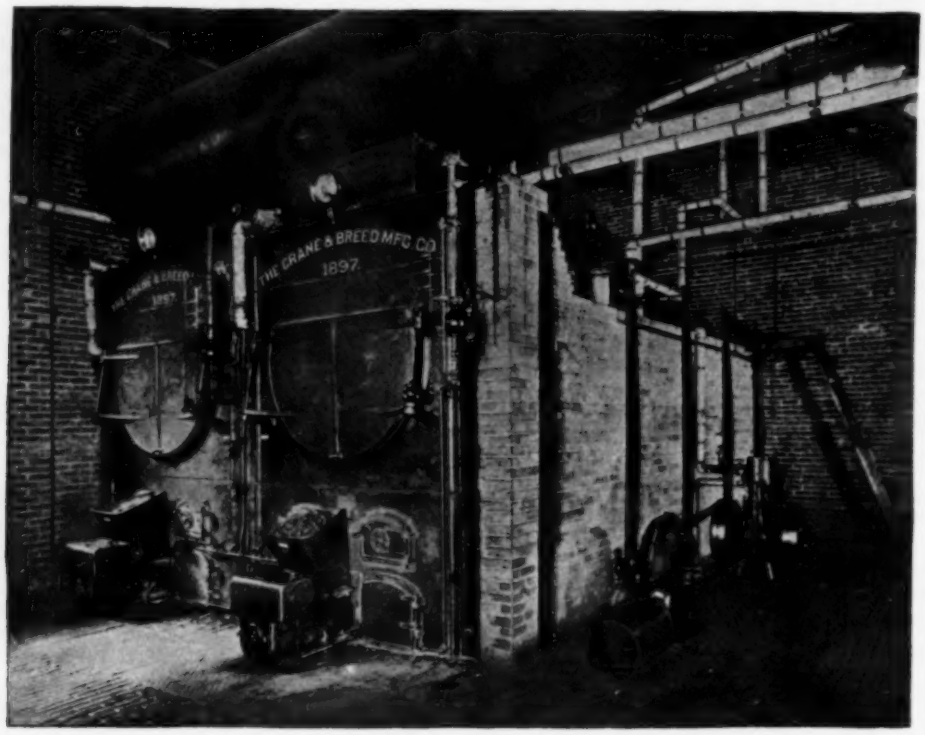


FIG. 1.—AMERICAN STOKERS AND STURTEVANT FAN.

the boiler room of the Crane & Breed Mfg. Co., of Cincinnati, in which are installed American stokers. The requisite air under the pressure necessary with this type of stoker is supplied by a No. 5 Sturtevant "Monogram" blower, driven by a 4 x 4 Sturtevant upright engine. Beneath the coal hopper and communicating with it is the conveyor, this in turn communicating with the magazine in direct line with it. A screw conveyor or worm is located in the conveyor chamber, and extends nearly the entire length of the magazine. Immediately beneath the conveyor chamber is located the wind-box, having an opening beneath the hopper. At this point is connected the piping for air blast. The other end of the wind-box opens into the air space between the magazine and outer casing or envelope. The upper edge of this magazine is surrounded by tuyeres or air blocks, these being provided with openings for the discharge of the air blast. The space on each side of the stoker, between the tuyere blocks and the side walls of the furnace, is occupied by dead plates or air-tight grates. The coal is fed into the hopper, carried by the conveyor into the magazine, and is there forced upward, "overflowing" on both sides, and spreading upon the dead grates the entire width of the furnace. The entire mass of coal above the tuyeres and all of that upon the dead grates is ignited, carrying a bed of burning coke from 14 to 18 inches in depth. The air is delivered in the approximate proportions of 150 cubic feet of air to each pound of coal fed, and at a pressure ranging from ½ ounce to 1 ounce at the tuyeres. This pressure is only such as to admit of the thorough mixing of the air with the coal, and is in no sense of the word a blast. A wind-gate, controlled by a lever, enables the operator to regulate the supply of air to suit the amount of coal fed. Being thus independent of natural draft, and the supply of coal under complete control, the fire can be forced at a moment's notice, and can be as quickly reduced.

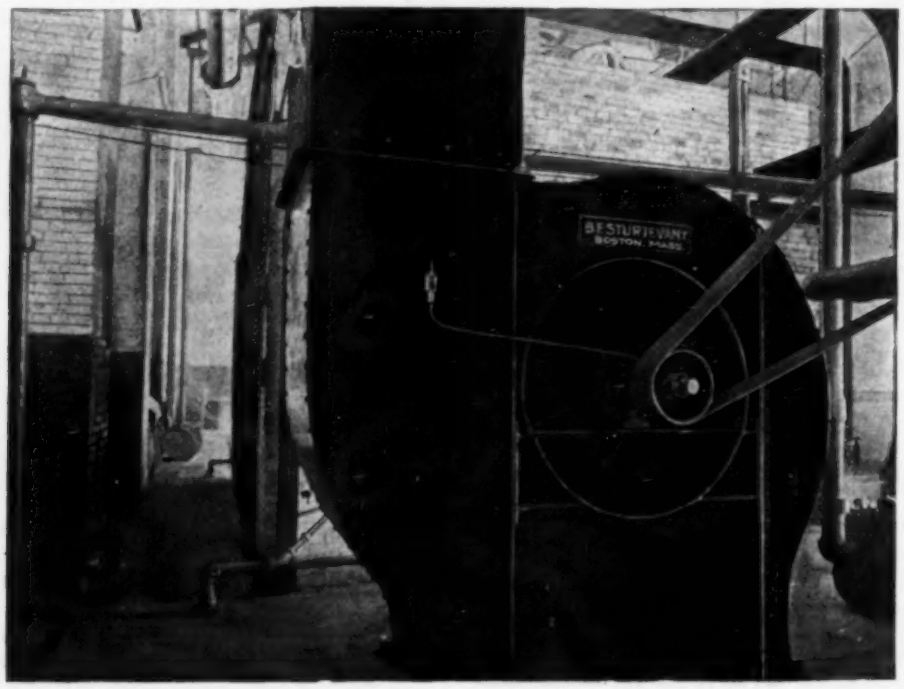


FIG. 2.—STURTEVANT FAN FOR MECHANICAL DRAFT AT POPE TUBE CO., HARTFORD, CONN.

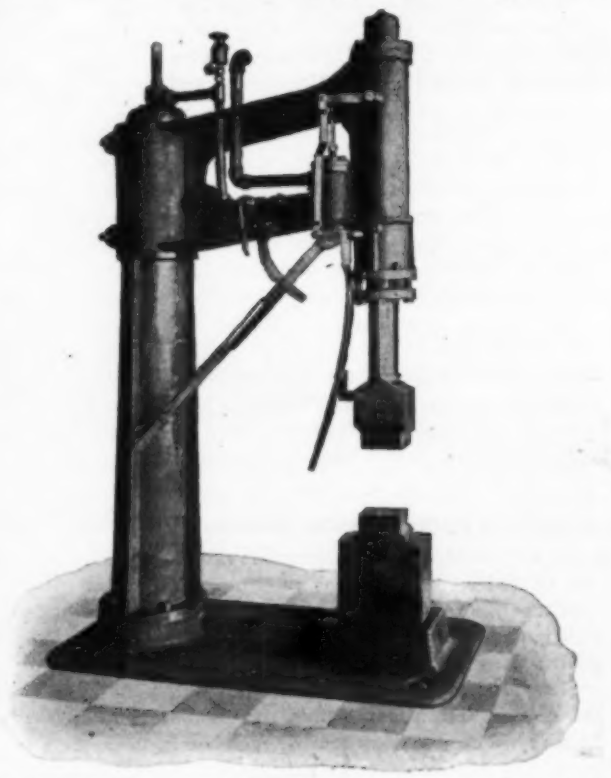
In Fig. 2 is a view of the inlet side of the Sturtevant fan as used with direct-connected engine at the plant of the Pope Tube Co. at Hartford, Conn. The plant consists of four horizontal tubular boilers, 78 inches in diameter by 18 feet in length, each containing 151 three-inch tubes, 18 feet long, and designed to work under a pressure of 135 pounds. The grates are of the Coxe traveling type, six feet wide, and move at a maximum rate of 12 feet per hour. The coal used is No. 2 buckwheat anthracite.

The draft is forced by a Sturtevant 66-inch fan direct-connected to a single-cylinder 5½ x 8¼-inch engine, which also drives the grates. The speed of the fan is regulated automatically by the steam pressure acting through a Locke damper regulator, so that the rate of grate travel and blast pressure keeps the steam pressure constant, irrespective of the demand for steam.

The air is discharged upward from the outlet of the fan, enters a horizontal main above the boilers and thence is delivered to individual rectangular pipes which connect with the ashpits. One of these pipes is shown in the illustration. There is a chambered arrangement of the ashpit, within which various pressures are maintained. A pulley upon the extended shaft in Fig. 2 serves as a means of driving the traveling grate.

BAIRD RADIAL STEAM HAMMER.

The U. Baird Machinery Co., of Pittsburg, manufactures a radial steam hammer of the type shown in the illustration. It is designed for welding steel and for general forging. The construction of the bracket carrying the hammer permits of



swinging the latter completely around the column; and where space is an object, the column can be dispensed with and a bracket furnished that can be hung on the wall or on a post. The operator will thus be able to swing the hammer against the wall when it is not in use.

Three sizes are made, the smallest having a 225-pound hammer and the largest a 500-pound hammer. The stroke is 20 inches. The steam pipes are made central, interposing no obstacle to the free swinging of the arm. An arrangement can be made to operate the hammer by foot. The parts are thoroughly made of reliable stock and are carefully finished. A hammer adapted to lighter work is also built by the U. Baird Machinery Co., in sizes from 100 pounds and heavier. The hammer swings on a bracket attached to a post or to the wall and the arm is of wrought iron lattice work.

At Newcastle, Del., the Delaware Iron Works resumed operations March 14, after a suspension of four months, giving employment to nearly 500 hands.

CONDITION OF BLAST FURNACES OF U. S.*

March. 1, 1898.

Location of Furnaces.	Coke and Anthracite.					Charcoal.				
	Total No. of Stacks.	In Blast.		Out of Blast.		Total No. of Stacks.	In Blast.		Out of Blast.	
		Number.	Weekly capacity.	Number.	Weekly capacity.		Number.	Weekly capacity.	Number.	Weekly capacity.
New York	18	3	4508	15	8017	5	1	100	4	448
New Jersey	5	2	1586	3	1327	.....	.....	.....	.....	.....
Spiegel	3	2	465	1	100	.....	.....	.....	.....	.....
Pennsylvania:						13	0	0	13	750
Lehigh Valley	37	9	6321	28	12580	.....	.....	.....	.....	.....
Spiegel	1	0	0	1	100	.....	.....	.....	.....	.....
Schuylkill Valley	17	7	6195	10	5539	.....	.....	.....	.....	.....
Upper Susqu. Val.	5	2	2112	3	1780	.....	.....	.....	.....	.....
Lower Susqu. Val.	9	3	5603	6	2486	.....	.....	.....	.....	.....
Spiegel	1	1	500	0	0	.....	.....	.....	.....	.....
Lebanon Valley	12	8	6502	4	1683	.....	.....	.....	.....	.....
Pittsburgh	28	27	54232	1	2450	.....	.....	.....	.....	.....
Spiegel	2	2	2684	0	0	.....	.....	.....	.....	.....
Shenango Valley	17	11	16937	6	3260	.....	.....	.....	.....	.....
Jun. and Con. Vals.	14	5	7818	9	4969	.....	.....	.....	.....	.....
Spiegel	1	1	321	0	0	.....	.....	.....	.....	.....
Youghiogheny Val.	3	1	1075	2	1900	.....	.....	.....	.....	.....
Miscellaneous	5	1	1393	4	2889	.....	.....	.....	.....	.....
Maryland	5	2	3556	3	3870	4	0	0	4	574
Wheeling District	9	9	13097	0	0	.....	.....	.....	.....	.....
Ohio:						9	0	0	9	730
Mahoning Valley	11	10	14097	1	690	.....	.....	.....	.....	.....
Central & Northern	11	11	15343	0	0	.....	.....	.....	.....	.....
Hocking Valley	2	0	0	2	850	.....	.....	.....	.....	.....
Hanging Rock	12	7	2417	5	1310	.....	.....	.....	.....	.....
Indiana	1	0	0	1	130	.....	.....	.....	.....	.....
Illinois	16	14	26738	2	1975	.....	.....	.....	.....	.....
Spiegel	1	1	500	0	0	.....	.....	.....	.....	.....
Minnesota	1	0	0	1	629	.....	.....	.....	.....	.....
Wisconsin	4	3	2882	1	770	.....	.....	.....	.....	.....
Missouri	3	1	700	2	700	1	1	334	0	0
Colorado	3	1	1400	2	3620	.....	.....	.....	.....	.....
Virginia	21	7	4982	14	9214	4	0	0	4	437
Kentucky	6	4	2012	2	1450	3	0	0	3	200
Alabama	32	18	19567	24	14070	12	2	795	10	2350
Mich. and Wisconsin	.....	.....	.....	.....	.....	17	7	3311	10	3530
Tennessee	13	4	3418	9	4819	9	1	276	8	2420
Georgia	2	0	0	2	960	3	1	294	2	360
North Carolina	2	0	0	2	600	.....	.....	.....	.....	.....
New England	.....	.....	.....	.....	.....	11	2	160	9	858
Texas	.....	.....	.....	.....	.....	4	1	200	3	770
Utah	.....	.....	.....	.....	.....	1	0	0	1	175
Oregon	.....	.....	.....	.....	.....	1	0	0	1	375
Totals	333	177	228962	156	94737	97	16	5470	81	13777

SUMMARY.

Fuel.	In Blast.						Out of Blast.			
	Number.			Weekly Capacity.			Number.		Weekly Capacity.	
		Month Previous.	Year Previous.		Month Previous.	Year Previous.		Month Previous.		Month Previous.
Charcoal	16	14	18	5,470	4,734	5,425	81	83	13,777	14,352
Coke and Anthracite	177	170	138	228,962	223,604	164,561	156	164	94,737	94,295
Total	193	184	156	234,432	228,338	169,986	237	247	108,514	108,647

*Condensed from the *Iron Age*.

The statement given in our last issue based on a press dispatch concerning the decision of the Michigan court of mediation and arbitration in the wage dispute at the Wheeler shipyards at West Bay City, was in error. The arbitrators, after hearing the evidence and examining the contracts for boats Nos. 124, 125 and 126, found: "1. That the wages of the chippers and calkers should be 25 cents per hour. 2. That the scale of prices in the F. W. Wheeler Shipyard for 1897 with a raise of 7 per cent added thereto, as per offer of said company to their employes under date of Jan. 20, 1898, is fair and reasonable under all the circumstances, and all the company could afford to do for labor in the construction of the three boats above mentioned. 3. That the agreement referred to in the evidence in this case as Exhibit 8 is not seriously objectionable, and can work no harm to the employes who are willing to do what is fair and right. 4. That no discrimination should be made against the employes or so-called 'strikers,' but that all of them should be taken back and given work, subject, of course, to the right which all employers have to decide as to the qualifications and competency of their employes."

The F. C. Austin Mfg. Co., Chicago, whose works were burned some weeks ago, will establish its new plant at Harvey, Ill., occupying the shops of the Harvey Steel Car Co., now in the hands of a receiver.

The largest steam users, the most conservative steam users, the advisory and consulting engineers, the mechanical men, those who run the plants, those who equip them,

THESE ARE OUR CLIENTS AND REFERENCES.

THEIR APPRECIATION OF THE

COCHRANE

OIL SEPARATORS, AND LIVE STEAM SEPARATORS

IS BASED ON

The principles of separation followed or the design—the mechanical construction and, what is surely the test, the performance of these "COCHRANES," the results given in actual, every-day service, by nearly 2,000 of these appliances.

And then we have the experience obtained in building and installing all kinds—oil, live steam, air, oil, ammonia; horz., vert., angle; cast iron, cast steel, wrought steel; receivers of huge capacity—all pressures, special shapes and for special conditions.

This experience should be valuable to you. It is at your service when you specify, order, or use "COCHRANES."

Harrison Safety Boiler Works, Philadelphia, Pa.

INDUSTRIAL SUMMARY.

New Buyers in the Market, and Some of Their Wants:—

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

B. F. Pearson, W. B. Ross, of Halifax, and F. S. Pearson of New York, are seeking incorporation as the Halifax Pipe Foundry Co., Ltd. The bill introduced in the Nova Scotia legislature, asks power to manufacture, smelt, work, mill and prepare for sale by any process metals for manufacturing or other purposes; to purchase, lease and operate coal, iron, copper and other mines, lines of railway, plant, etc. The capital stock is to be $50,000. It is provided that the company shall not commence operations until 50 per cent of the capital is subscribed and 25 per cent paid up.

The Reilly Steam Pump Co., Louisville, Ky., has been incorporated by J. J. Reilly, George A. Sommerville, and Edward Graupin. The capital stock is $50,000, and it is proposed to manufacture and handle steam pumps and pumping machinery.

S. W. Reams, Spartanburg, S. C., is in the market for lathes, shapers, planers, etc. Second-hand will do.

E. M. Hodges, Kinston, N. C., asks prices on Corliss engines, boilers, shafting, pulleys, hangers, belting, etc.; fire pumps, condensing apparatus, etc.

Application will be made by Charles A. Walters, Pliny L. Pierpoint, Charles W. Walters, John Hagmaier and Stephen A. Bright to incorporate the Walters Stove Co., of Sharpsburg, Pa.

The Sweets Steel Co., of Syracuse, N. Y., has been incorporated to manufacture steel goods. The capital is $100,000. The directors are: A. N. Palmer, J. W. Smith, Ethel Sweets, J. S. Finch and Peter Eckel.

The Kirk-Latty Co., of Cleveland, has been incorporated by F. M. Kirk, S. D. Latty, H. T. Latty, Wm. Bates and J. H. Woods. It will manufacture bolts, nails and tacks.

The Parlin & Orendorff Co., Canton, ill., whose intention is to build a foundry, is in the market for a cupola and other foundry equipment. The company will also install a new steam plant of 755 horse power, including a 24 x 48 Corliss engine.

New Construction:—

The Lewis Foundry & Machine Co., of Pittsburg, has secured the contract for the erection of a steel rail plant for the McKenna Steel Works Co., of Joliet, Ill., at Armourdale, a suburb of Kansas City, Mo. It will be a duplicate of one erected at Joliet and will cover six acres. About 200 tons of structural steel will be needed for the buildings, which will be erected by the Schiffler Bridge Co., of Pittsburg. The machinery, consisting of two trains of 24-inch rolls, straightening presses, hot and cold saws, etc., is being made at the Lewis plant. In the McKenna plants old rails are treated for the manufacture of new rails. The new mill is to be completed by July 1.

For the new steel building to be erected at the American teel Casting Co.'s Sharon, Pa., plant bids have been submitted and work will begin soon. The building will be 200 x 215 feet. It is to be finished in 60 days.

It is reported that the Santa Fe Road will erect a machine shop, 300 x 800 feet, and a foundry, 300 x 500 feet, in Topeka, Kan.

The Fort Pitt Bridge Co., of Canonsburg, Pa., has the contract for erecting the new market house in East Liberty, Pittsburg. The building will be 365 x 156.

The new Pennsylvania Car Wheel Co.'s plant in Allegheny is expected to be in operation by April 1.

The general contract for erecting the new works of the Epping Carpenter Co., of Pittsburg, has been let and work will be begun immediately. Machinery and general equipment are now being purchased.

The Geo. B. Swift Co., of Chicago, general contractors, has secured the contract for the building of the shops of the Cleveland, Cincinnati, Chicago & St. Louis at Urbana, Ill., and will begin work on the seven buildings April 1.

The United States Radiator Co., of West Newton, Pa., will build a foundry 100 x 50 feet, and a machine shop 50 x 100 feet, thereby about doubling their present capacity.

The Berlin Iron Bridge Co., East Berlin, Conn., has contracted to furnish the Hartford City Gas Light Co., of Hartford, Conn., another of the steel roofs lined with patent anti-condensation fire-proof roof lining, such as the Gas Light Co. has used with good results heretofore. The new building is 35 feet wide and 70 feet long, having brick sides and iron roof.

Additions, Enlargements, Removals, Etc.:—

At the plant of the Hegewisch (Ind.) Car Co. a new wing will be added to the present building, 100 x 80 feet in size.

Mitchell, Tranter & Co., of Covington, Ky., have had propositions from the Indiana Gas Belt looking to the removal of their rolling mills.

Kelly Axe Mfg. Co., Alexandria, Ind., is building a large warehouse and a new office. It has made additions to its factory which will considerably increase its capacity.

General Industrial Notes:—

The Westinghouse Electrical & Mfg. Co. is at work on another giant generator of 5,000 h. p. for the Niagara Power Co. The Westinghouse company has received an order for nine generators of this type from the Niagara company, and when they are completed it will give that concern a generator capacity of 40,000 h. p., the largest in the world. Another important contract the Westinghouse company has secured is the furnishing of 15 of these 5,000 h. p. generators to the St. Lawrence Construction Co., whose plant will be at Massena, N. Y. These immense generators will be used to furnish electricity for commercial use in the district near the falls, and the power will be transported to all the towns within a distance of 50 miles from the falls. They will be run by means of an immense turbine wheel, operated by the falls at Niagara. This installation will make the plant of the St. Lawrence Construction Co. one of the largest in the world.

At the annual meeting of the Ohio River Sheet & Tin Plate Co., of Remington, Pa., held last week, the following officers

MOUNT SAVAGE FIRE BRICK.

UNION MINING CO.,

Proprietors of the CELEBRATED Mount Savage Fire Brick

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Established 1841. Capacity, 60,000 Per Day; 18,000,000 Per Year.

The First Manufactory of its Kind in the U. S.

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Branch Offices:—No. 1 Broadway, New York, N. Y.; No. 222 So. Third St., Philadelphia, Pa.; Ferguson Block, Pittsburgh, Pa., Stowe, Fuller & Co., 195 Merwin St., Cleveland, Ohio.

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Flange Plates, Ship Plates, Tank Plates, Steel Car Axles and Forgings of all kinds.

Steel Castings from 100 to 75,000 lbs.

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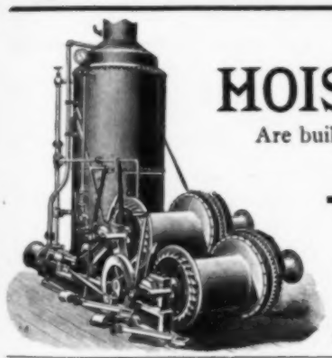
Agencies: NEW YORK, 97 Cedar St. CHICAGO, Old Colony Bldg.
ST. LOUIS, 516 N. Third St. WASHINGTON, Kellogg Bldg.
MONTREAL, J. G. Sibbald, 3 Windsor Hotel.
SAN FRANCISCO, John Woodlock, 26 Beale St.



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THE IRON TRADE REVIEW

Is an increasingly valuable medium through which to sell equipment to machine shops and foundries.

were elected: Alexander Saulters, president; A. G. C. Rhodes, secretary and treasurer; directors, Alexander Saulters, Thomas P. McDonough, M. Rood, George Wood and Jesse Delo.

The majority of the strikers in the bolt department at Oliver Iron & Steel Co.'s mill have returned to work at the old scale and the strike is practically at an end.

Miller Brothers & Co., engineers and contractors, Tradesmen's Bldg., Pittsburg, Pa., have received a contract for a four-door heating furnace for the Ajax Forge Co., of Chicago, and also an order for the additional work at the Joliet works of the Illinois Steel Co.

At a meeting of the stockholders of the Pottstown Iron Co., held on March 8, the following officers were elected: Andrew Wheeler, president; Austen S. Hecksher, vice-president; Chas. H. Ashburner, treasurer; Andrew Wheeler, Jr., secretary. The rolling mill has been leased to the Glasgow Iron Co., which company will operate the plant, including the universal mill, 112-inch, 65-inch, 60-inch, and nail plate mills, with 24 double puddling furnaces.

The Carnegie Steel Co., Ltd., of Pittsburg, is having built at the Brooks Locomotive Works, Dunkirk, N. Y., two heavy six-wheel switching engines for use on the Union Railroad. They will have wagon top boilers and will weigh about 103,000 pounds each.

The old Graff, Bennett & Co. plant at Millvale, a suburb of Pittsburg, was sold last week to Dreifus, Block & Co., Pittsburg scrap dealers. The plant is one of the oldest in Allegheny county and at one time made skelp and bar iron. Latterly it was owned by Friend, Hoffstat & Co., of Pittsburg. The property will be laid out in city lots. The machinery will be removed from the grounds at once. Some of it will be refitted and sold, while the remainder will be consigned to the scrap pile.

The Sharon Boiler Works, Ltd., of Sharon, Pa., has shipped material to Knoxville, Tenn., where several gas producers are being erected for the Knoxville Iron Co.

The German-American Steel Co., a new concern, may locate at Allentown, Pa.

The Lackawanna Iron & Steel Co., of Scranton, will put in blast the Colebrook furnace No. 2 at West Lebanon, which has been idle several months.

The Glasgow Iron Co. has taken charge of the plant of the Pottstown Iron Company, except the blast furnace and steel mill. The rolling mills are to be run steadily.

J. V. Rose, proprietor of the Sharon (Pa.) Fire Brick Works, is filling a large order received from the Norway Iron & Steel Co., of New Castle, for fire brick to be used in the erection of hot blasts at the Rosena Furnace.

At the annual meeting of the Lackawanna Iron & Steel Co., held March 3, the following figures were given: The profits on coal amounted to $239,641.95, though the company's net loss amounted to the sum of $992,899.11, showing that the company operated its works outside of coal mines at a loss of $1,232,541.06. The company's surplus, which in the six years, 1891–1896, had risen to $1,356,689.45, was reduced to $363,790.34. The following Board of Directors was elected: Samuel Sloan, W. E. Dodge, S. S. Palmer, D. C. Blair, New York; Walter Scranton, New Jersey; Moses Taylor, Pyne, N. Y.; E. B. Sturges, Henry Wehrum and Austin B. Blair, Scranton, Pa.

The Shelby Steel Tube Co. announces that the general sales

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Machine Tools and Supplies. Send for list of Second-hand Tools.

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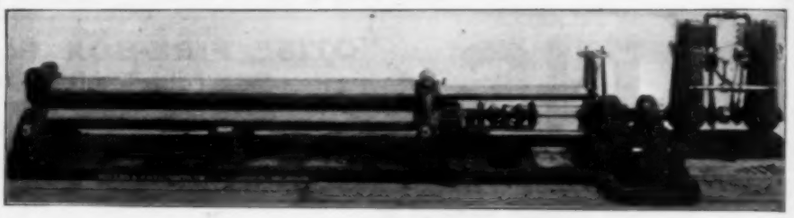

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offices of the company will be removed to the American Trust Building, Cleveland, on April 1. The purchasing department will be located with the general sales office in Cleveland. All correspondence on and after April 1 pertaining to purchases for the factories at Shelby, O., Toledo, O., Ellwood City, Pa., and Greenville, Pa., should be directed to Cleveland. The branch offices and warerooms will still be continued at No. 135 Lake st., Chicago, and No. 144 Chambers st., New York City.

The A. Garrison Foundry Co., of Pittsburg, has just shipped a 36-inch reversing blooming mill to the Colorado Fuel & Iron Co., of Pueblo, Colo. A 30-inch, three-high plate mill is now being made for the same company.

The contract for erecting 24 new hot and cold mills at the Monongahela Tin Plate Co.'s plant at Pittsburg has been awarded Mackintosh, Hemphill & Co.

The Sheridan (Pa.) furnaces, operated by Grubb & Kaufman, Ltd., but which are at present idle, will be sold at the Reading Exchange on April 5. The plant consists of two anthracite furnaces, with a capacity of 200 tons per day, nearly 30 acres of ground and a number of tenant houses.

The stockholders of the Pennsylvania Steel Co. held their annual meeting last week. The report for the year showed a loss at Steelton of $124,000. The Maryland Steel Co.'s plant at Sparrow's Point has been in operation since May, and also shows a loss. This plant has been using up a lot of high priced ores, and experienced the usual difficulty with inefficient help, incident to starting all new enterprises of large magnitude. The plant has shown a decided improvement from month to month, and in January was operated at a profit. In January an alliance was entered into with the largest producers of Cornwall pig iron at Lebanon, under the terms which a supply of pig iron is assured for the Steelton works at a price based upon the selling price of rails.

The night turn of March 7 at the Ohio Steel Co.'s plant at Youngstown, O., turned out 406 ingots. The tonnage is not given, but at 2½ tons to the ingot it would be 1 015.

The Edward P. Allis Co., of Milwaukee, has sold to the Ætna-Standard Iron & Steel Co., of Bridgeport, O., for its Mingo Junction plant, one of its steeple type cross compound condensing blowing engines. The engine will have two blowing cylinders, 84-inch diameter by 60-inch stroke, one 42-inch diameter high and one 80-inch diameter low pressure steam cylinder, each 60-inch stroke. The main shaft of this engine is 23 inches diameter; fly wheel will be 24 feet diameter, weighing 100,000 pounds. The engine will be fitted with Reynolds' independent air pump and condenser. It will be capable of delivering 40,000 cubic feet of free air per minute at 20 pounds pressure per square inch.

A bed plate for a bolt heading machine for the Ajax Mfg. Co., Cleveland, was cast by the Walker Co., Cleveland, last week. It weighed 40,000 lbs. Another similar casting weighing 35,000 lbs. is to be cast.

The Davis & Egan Machine Tool Co., of Cincinnati, has just received through its office at Berlin, Germany, orders from the "Gewerkschaft Deutscher Kaiser" at Brückhausen

INLAND IRON & FORGE CO.,

Marquette Building, CHICAGO, Manufacturers of

BAR IRON AND STEEL,

Angles, Channels and Special Shapes for Car, Carriage and Wagon Work.

Iron and Steel Car Axles and Forgings.

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As we control its manufacture
Our steel, we know will never fracture.
And We our reputation stake
On every rivet that we make.
VICTOR BOILER RIVETS
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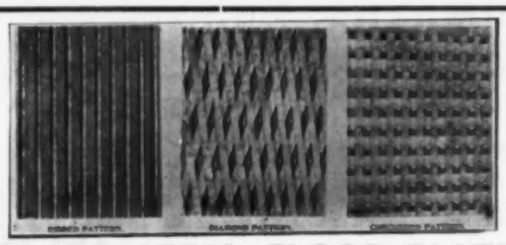
CHAMPION RIVET CO. CLEVELAND
ARE THE BEST RIVETS MADE



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J. F. CORLETT, Sales Agent, Perry-Payne Bldg., CLEVELAND, O.

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(Rhenish Prussia), for 14 machines, including lathes, planers, shapers and drill presses. This is the largest steel works in Germany. The Cincinnati company has also received through the same office order from the Inter-Nationale Bohr-Gesellschaft for 12 lathes and 10 drill presses. The company is now running day and night and the plant it recently purchased in Covington, just across the river from Cincinnati, will be in full operation in the course of a few weeks.

The cast iron pipe foundry of the West Superior Iron & Steel Co., West Superior, Wis., will be started this month on contracts which are expected to require several months to fill.

The Old Alcalde Furnace, Rusk, Tex., was blown in March 1.

The Eagle Iron & Steel Co., Ironton, O., are installing a three-high muck mill.

Besides the installations at the Carrie Furnace, Pittsburg, and the Struthers Furnace, at Struthers, O., Uehling pig iron conveying apparatus is being built for the Millom & Askam Hematite Co.'s plant at Barrow, Eng., and at the Roechling Stahl Eisenwerke in Germany. The Uehling machine on a recent day handled over 1,500 tons of iron, taking care of all the metal from three of the Duquesne furnaces.

The Bass Foundry Co., Ft. Wayne, Ind., has the contract for a pair of Corliss engines for the Inland Steel Co., Chicago Heights, Ill.

The Viaduct Brass Works, Cleveland, and the Monroe Mfg. Co., Toledo, O., will be dismantled and sold out by Reade & Bowler, of Cleveland.

The Marinette Iron Works, West Duluth, Minn., will be sold April 2 under foreclosure proceedings.

The contract for furnishing cast iron pipe for the year to Grand Rapids, Mich., has been given to the Lake Shore Foundry Co., Cleveland, at $15.85. The recent bid of the company for furnishing pipe to the city of Cleveland was $17.45.

The Dayton Coal & Iron Co., Dayton, Ky., has put in blast No. 2 furnace.

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Safety Hoist

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Runs as freely as an ordinary rope tackle block. Holds more securely than a chain block. Locks instantly and does not cut the rope. Allows the load to be lowered safely and slowly, the operator using only one hand. Can not stick nor jam when the load is to be lowered.

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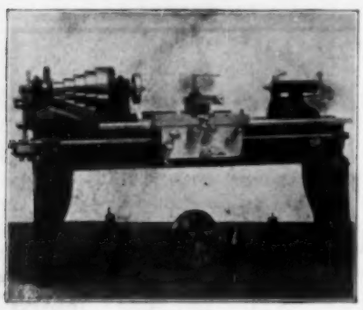

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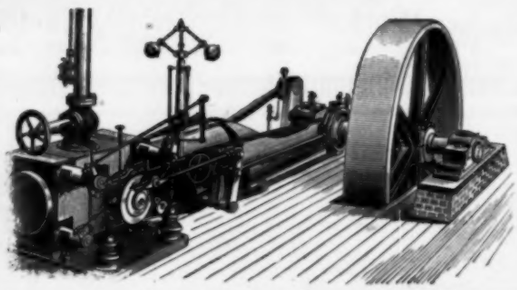

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Pittsburgh, Bellaire and East	† 3:15 pm	† 6:25 pm
Philadelphia and New York	* 1:40 pm	*11:25 am
Baltimore and Washington	* 1:40 pm	*11:25 am
Alliance and Pittsburgh	* 1:40 pm	*11:25 am
Ravenna and Alliance	* 5:00 pm	* 8:40 am
Philadelphia and New York	*11:10 pm	* 4:30 am
Baltimore and Washington	*11:10 pm	* 4:30 am
Alliance and Pittsburgh	*11:10 pm	* 4:30 am

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Columbus and Cincinnati	* 8:50 am	* 5:30 pm
Indianapolis and St. L.	* 8:50 am	* 5:30 pm
Millersburg and Akron	† 3:15 pm	†12:10 pm
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